

Imperial Agricultural Bureaux

Ninth Annual Report

OF THE

Executive Council

1937-1938

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PREFACE

The Imperial Agricultural Research Conference, 1927, stressed (a) the need for scientists to be in touch with the progress of research throughout the world in their several branches, and (b) the difficulty therein owing to the great output of scientific literature and the diversity of languages in which it is published.

2. It recommended the Governments of the British Commonwealth to establish on a joint co-operative basis eight bureaux to collect, collate and disseminate information on research in eight selected branches of agricultural science and generally to assist research workers in the Empire with information relevant to their subjects. Each bureau was to be located at a research Institute specializing in its own branch of science so that the bureau officers should be in daily contact with men engaged on research in its own subject. These bureaux were to be financed from a common fund contributed by Empire Governments in agreed proportions and controlled by a Council composed of representatives of those governments on an equal footing.

3. Governments accepted these proposals. In November, 1928, a new type of inter-Imperial co-operative agency acceptable to all governments was worked out in detail. On 1st April, 1929, the Executive Council of the Imperial Agricultural Bureaux came into being. The eight bureaux started work in that year.

4. Following the Ottawa Conference of 1932 the work of several inter-Imperial agencies was examined and reported upon by the Imperial Committee on Economic Consultation and Co-operation (1933). This Committee approved of the bureaux organization and of its work, and extended the duties of the Council, *inter alia*, proposing that with effect from 1st October, 1933, it should also be responsible for the supervision and administration and finance of the Imperial Institute of Entomology and of the Imperial Mycological Institute.

5. It also enunciated certain general principles to be observed in regard to the organization of agencies for inter-Imperial co-operation and consultation, *e.g.*, Constitutional equality of participating governments in the appointment of the Authority administering the work; the provision of adequate finance for a definite period of years; careful and periodical examination of the work and organisation of the Agency at Empire conferences suitable for the purpose, as without that assurance governments could hardly be expected to provide the adequate continuing finance; responsibility of the administering authority to all participating governments. All Governments accepted this report.

6. The British Commonwealth Scientific Conference (1936) conducted the first of these "periodical examinations". It approved both the work and organisation. It recommended the finance necessary until 1941-42, its distribution between governments, also the formation of two more bureaux, and certain modifications in practice designed to improve general efficiency. Governments accepted these proposals.

7. The organizations under the administration of the Executive Council are:—

The Imperial Institute of Entomology, with its branch the Laboratory for Biological Control of Insect Pests

The Imperial Mycological Institute and the Bureaux of

Soil Science.	Pastures and Forage Crops.
Animal Health.	Horticulture and Plantation Crops.
Animal Nutrition.	Agricultural Parasitology (Helminthology).
Animal Breeding and Genetics.	Dairy Science.
Plant Breeding and Genetics.	Forestry.

8. A "liaison" officer appointed by the appropriate department in each participating country keeps in touch with administrative matters, and in each country for each bureau a scientific officer is nominated as Official Correspondent to be "the general friend" on scientific matters of that bureau in that country. The Heads of the several Institutes at which bureaux are located act as Directors of the bureaux, thus giving the Council and bureaux the benefit of their wide experience and scientific knowledge. All other officers are whole-time servants of the Executive Council.

REPORT

At its annual meeting on 28th September, 1938, the Executive Council of the Imperial Agricultural Bureaux adopted the following report relating to its ninth year's work—1st April, 1937, to 31st March, 1938.

A. The Executive Council

Sir Donald Fergusson, K.C.B., and Mr. J. A. Calder succeeded Sir Charles J. Howell Thomas, K.C.B., K.C.M.G., and Mr. R. V. Vernon, C.B., on the Executive Council as representatives respectively of the United Kingdom and of the Colonies, Protectorates and Mandated Territories. Both Sir Charles and Mr. Vernon were members of the special Committee in 1928 which worked out the scheme of organization of the Council and had continuously represented their countries on the Council from its creation until their retirement from the Civil Service.

B. The British Commonwealth Scientific Conference, 1936

2. The chief recommendations of this Conference were summarized in the report of the previous year. During 1937–38 the Executive Council was informed by the various governments that they accepted the proposals of the Conference. The work of giving effect to them was put in hand.

3. The recommendations fall under three groups :—

(a) Finance—the Conference recommended the annual provision necessary for the five years 1937–38 to 1941–42 for the bureaux, the Institutes of Entomology and Mycology and for the Laboratory for Biological Control;

(b) Changes in administrative practice;

(c) The formation of two new bureaux for Dairy Science and Forestry respectively.

C. The Bureaux

4. *Personnel*.—At the request of the Council Professor F. L. Engledow, C.M.G., Draper's Professor of Agriculture, Cambridge University, succeeded Sir Rowland Biffen, F.R.S., who had retired, as Director of the bureau of Plant Breeding and Genetics.

Two appointments to Deputy Directorships were made in the year—Mr. A. E. Fountain to the bureau of Agricultural Parasitology (Helminthology) and Mr. W. G. Sutton of the Massey Agricultural College, New Zealand, to the new bureau of Dairy Science.

Dr. W. McCartney was appointed as another Scientific Assistant at the bureau of Animal Nutrition, Mr. G. K. Argles accepted a post in Jamaica and accordingly resigned from the staff of the bureau of Horticulture and Plantation Crops.

Dr. P. S. Hudson—bureau of Plant Breeding and Genetics—was absent on sick leave for part of the year.

5. *Accounts.*—The audited statements are attached. Total contributions received in the year were £25,533 1s. 4d., as against £24,552 10s. 0d. due. The excess collection is due to the difference between the payments made by some governments for the provision of the Forestry bureau and a few short payments from a few governments. Inability to start the Forestry bureau (*vide* below) within the year caused the Council to set payments made thereto against the sum due for 1938–39 and not to press others for payment for 1937–38. The short payments were due very largely to differences between the accounting periods of some governments and of the Council. These sums are under correspondence and adjustment. The adjustment between the two figures due in the year (£24,552 10s. 0d.) and that received (£25,533 1s. 4d.) is as follows :—

	£	s.	d.
Due in 1937–38, excluding provisions for forestry	24,552	10	0
Add : (i) Due for 1936–37 and received, but not cleared on 31st March, 1937		34	18 9
(ii) Excess contribution from Colonies		0	10 0
	24,587	18	9
Less short payments	501	15	5
	24,086	3	4
Add received towards forestry and carried forward to 1938–39	1,446	18	0
Total received	£25,533	1	4

6. The short payments in the year, amounting in all to £501 15s. 5d., were made up as follows:—on the India-Burma contribution (£271 5s. 0d.), the Union of South Africa (£140 12s. 6d.), Australia (£54 3s. 9d.), the Windward Islands and British Guiana (£35 14s. 2d.). Of the last item £34 4s. 3d. has since been received.

7. Net expenditure, including the deficiency payment of £81 2s. 5d. on account of the Journal of Dairy Research, was £24,491 14s. 11d., which closely corresponds to the contributions due in the year (£24,552 10s. 0d.). This was much more favourable financially than had been expected, due to :—

- (a) underspending on the Bureau of Dairy Science;
- (b) increase in contributions (*viz.*, £977 10s. 0d.) and increase in receipts from sales (£372 7s. 11d.);
- (c) underspending in one or two bureaux, chiefly at that of Animal Health, Weybridge.

As a result reserves were not drawn upon in the year. That had been necessary in each of the three previous years and both the Imperial Committee

on Economic Consultation and Co-operation in 1933 and the British Commonwealth Scientific Conference, 1936, had approved of those balances being drawn upon when necessary.

8. Receipts from sales of publications over the last seven years.

Receipts from sales of publications
a. (other than Nutrition Abstracts and Reviews)

—	1931-32	1932-33	1933-34	1934-35	1935-36	1936-37	1937-38
Soil Science.. ..	£ 51	£ 57	£ 73	£ 103	£ 404	£ 276	£ 306
Animal Health	756	735	1,161	1,328	1,287	1,373	1,293
Animal Nutrition	19	54	22	16	20	12	29
Animal Breeding and Genetics	7	12	79	151	160	156	229
Horticulture and Plantation Crops	55	61	115	126	160	151	241
Pastures and Forage Crops	38	54	83	136	208	217	444
Plant Breeding and Genetics	46	77	123	128	131	268	258
Agricultural Parasitology (Helminthology).. ..	13	15	18	22	353	295	364
Headquarters	4	15	5	13	4	46	2
Total	989	1,080	1,679	2,023	2,727	2,794	3,166

b. Nutrition Abstracts and Reviews

Nutrition Abstracts and Reviews	632	840	841	973	1,168	1,920	1,902
Gross total	1,621	1,920	2,520	2,996	3,895	4,714	5,068
Yearly increase	—	+299	+600	+476	+899	+819	+354

The Medical Research Council of the United Kingdom and the Trustees of the Reid Library, Aberdeen, contribute to the production of Nutrition Abstracts and Reviews and are represented on its Managing Committee. The accounts of that journal are accordingly kept separate from the Council accounts and are separately audited. Hence they are shown separately in the table above.

9. The increases in the receipts at the bureaux of Pastures and Forage Crops, Horticulture and Plantation Crops, Agricultural Parasitology (Helminthology), Plant Breeding and Genetics and Animal Breeding and Genetics are noteworthy and encouraging.

10. Total receipts from sales of publications—after deducting book-sellers' commission—have for the first time exceeded £5,000. That speaks

highly for the usefulness of these journals. But as the last line of the foregoing table shows, the rate of expansion has fallen. These are specialist publications, and after a certain stage expansion in sales is likely to be slow. To have reached in eight years total receipts of £5,000 in a year is good; but a falling off in the rate of expansion may prove serious, as the British Commonwealth Scientific Conference, in fixing the rates of increased contributions, assumed that over the five years the revenue from sales would increase by an average of £600 a year. At the same time the Conference contemplated that many additional subscribers would be obtained through the efforts of the "liaison" officers. These officers (*vide* below) were only appointed during 1937-38 and their efforts have not affected the receipts for that year.

11. *Journals*.—Until December, 1937, the Bureau of Soil Science had been issuing regularly a number of mimeographed papers entitled Publications on Soils and Fertilizers, Monthly Letters, Recent Developments in Soil Analysis and Summaries of Recent Reports. With effect from 1st February 1938 these have been combined into one printed publication—"Soils and Fertilizers"—appearing monthly. This bureau, like all the other bureaux, has now its regular printed journal. The journal contains abstracts of current literature, extended summaries of departmental reports and what was originally the "monthly letter."

12. *Bibliography of Soil Science, Fertilizers and General Agronomy 1934-1937*.—The mimeographed Publications on Soils and Fertilizers was a running list—with short abstracts or extended titles—of all articles which appeared on soils and fertilizers. It (like its printed successor) is thus an immediate index to current articles. As such it is immediately useful; but with twelve issues a year, the search of back numbers becomes not only tedious but requires care to avoid missing any that may be relevant. In 1934 the Soil Science bureau compiled from these monthly lists and issued a "Bibliography on Soil Science, Fertilizers and General Agronomy 1931-1934." This volume was well received and met with a good demand. Towards the close of 1937 it began to prepare a similar bibliography to cover the years 1934-37. It was finished and placed on sale (25/-) in the early summer of 1938, and contains over 7,500 references. The international Decimal System has been used throughout both volumes. These two handy volumes together give a full subject index to the literature on soils, fertilizers and general agronomy from 1931 to 1937 inclusive, and so should prove specially useful to all libraries, research institutes and soil chemists.

13. *Technical Communications*.—Eleven Technical Communications were issued during the year, among which may be mentioned :

Erosion and Soil Conservation.

The design and analysis of factorial experiments.

Production of grass seeds.

A review of the literature on stock scion incompatibility in fruit trees.

The influence of climatic conditions on type composition of grasses.

All the technical communications dealt with subjects of practical and immediate importance to research workers in the British Commonwealth. Soil erosion is causing much anxiety in many countries. The Technical Communication—entitled *Erosion and Soil Conservation*—which was jointly prepared by the bureaux of Soil Science and of Pastures and Forage Crops is the first attempt at a world survey of this almost universal problem. It covers conditions and measures in 33 countries, and in response to requests many scientists in those countries supplied for this publication, information hitherto unpublished.

Compatibility and incompatibility between stock and scion are matters of practical importance to the fruit grower. They are also one of the biological "wonders" in life. The literature on this subject is bulky, scattered and confused. The review of it in one compact publication which has been issued by the bureau of Horticulture and Plantation Crops should be of use to the fruit grower, the horticultural investigator and the plant physiologist. The review itself closes with lists of rootstocks which have been tested for pears, plums, peaches, apricots, almonds and cherries, the results recorded and references to the publications in which those results are described in detail. The results of 818 such trials are there recorded, pears (209), plums (396), peaches (81), apricots (34), almonds (18) and cherries (80).

The technical communication on the design and analysis of factorial experiments goes to the root of much experimental work—viz., the lay-out of experiments and the statistical interpretation of the results obtained. Obviously the validity of claims made as a result of experiments depends on the correct interpretation of the results obtained; and where experiments involve, as they frequently do, the testing of several alternatives in various combinations, a rigorous technique for the lay-out of the experiments in the first instance and later for determining the significance of differences recorded and whether those differences can with confidence be attributed to specific causes, go to the root of the whole matter.

14. Several other technical communications were in preparation throughout, but not published within the year. The bureau of Animal Health at Weybridge was busily engaged on one on Mastitis. Mr. Munch-Paterson, in Australia, had a few years ago prepared a review covering much of the literature and, with a view to its publication, the bureau invited him to revise and bring up to date this review. He kindly agreed and before issue the work was thoroughly revised by him and by the bureau. The work on this and changes in staff combined to cause arrears in the regular work of this bureau.

15. The demand for particular technical communications is difficult to assess in advance. Reproduction and re-issue is sometimes necessary. For instance the supply of the technical communication on "Vegetative Propagation of Tropical and Sub-Tropical Fruits" first issued in 1936 was exhausted

by March, 1937. It was reproduced early in 1937-38. Copies are again available to meet a demand which is still persisting.

16. The British Commonwealth Scientific Conference report made a number of recommendations or suggestions designed to increase the utility of the bureaux, to make their services better known, and to define more clearly their scope or spheres of activity. Action was taken on all these by the Council and by most of the governments within the year.

17. The names of the following bureaux were recast with effect from 1st January, 1938, in accordance with the recommendations of the Conference to be as follows :

The Imperial Bureau of Plant Breeding and Genetics.

The Imperial Bureau of Pastures and Forage Crops.

The Imperial Bureau of Animal Breeding and Genetics.

The Imperial Bureau of Horticulture and Plantation Crops.

The Imperial Bureau of Agricultural Parasitology (Helminthology).

18. *Direct Services.*—Reference was made in the previous year's report to the ever expanding output of scientific literature in the world, increasing, of course, both the work which falls on the bureaux and the need for a service such as the bureaux perform. That has continued, but many of the bureaux also note an increase in requests for reprints, translations or special enquiries. That indicates more direct use of the bureaux by individual scientists. The stocks of reprints which most of the bureaux have been forming, help in answering such needs. Where translations are made, copies are preserved and from time to time lists of translations available are circulated.

19. Such direct service, in response to particular requests, is a form of the bureau service useful to, and valued by, those who avail themselves of it. It also helps the bureaux. It shows them the particular questions which are interesting scientists in the various countries and the shortages in the information available to them. Direct contact with research workers has always been the aim of the bureaux. A bureau service would lose much of its vitality if it became impersonal and remote. In fact, the whole conception depends on the bureaux being increasingly regarded by every agricultural scientific department as "part of its own show." Direct communications with—and where possible direct aid to—individual scientists promotes that feeling and recognition. At the same time the bureaux are not private enquiry agencies. They serve all. The information they have collected—sometimes after much labour—to answer some enquiry may interest other research workers. When that interest is sufficiently clear and general a Technical Communication is prepared and published. But often that step is not justified. How to discover and reach the few who may be interested is a problem. The bureaux have tried to meet this in various ways—e.g. by the circulation of lists of translations available, etc. The bureau of Horticulture and Plantation Crops has tried another method. It circulates, cyclostyled, each quarter a selection of the enquiries it has received, giving very briefly

the subject, the country of provenance of the enquiry and the nature of the reply sent. At times it says its information is incomplete and states that "any further information would be welcome." The result of this effort is being closely watched. At times the response has been so good as to suggest that research workers not only find it helpful but are prepared to help others by sending the bureau information where it has called for it. At other times it has seemed as if it created little interest. At any rate it is an attempt to associate co-operatively all horticultural workers with the bureau and its activities.

20. *Liaison Officers*.—Yet whilst direct contacts between the bureaux and research workers are desirable they cannot take the place of a general and widespread understanding of the purposes of the bureaux, their services, their constitution and organization. During the year, six governments, viz., those of Canada, Australia, New Zealand, the Union of South Africa, Southern Rhodesia and the Colonial Empire nominated officers in their own countries to act as "liaison" officers for the bureaux. Their functions are described in the report of the Conference as follows:—

"The Conference recommends, therefore, for the consideration of governments, that in each country* the appropriate authority should nominate an officer—described in this report as the liaison officer—whose duties should be:—

- (i) to become thoroughly familiar with the principles underlying bureau organization, with the scope of the various bureaux, with their progress, and with the distribution of their literature;
- (ii) to further the knowledge of the various bureaux among the research workers in the area he represents and by suggestion and advice, either to bureau officers or to research workers and others in his area, to promote the usefulness of the bureaux generally, either by the communication of programmes of research work or otherwise.

In particular cases it may be necessary for more than one such officer to be appointed. In addition to this officer for bureau work in general the Conference recommends that each contributing government should appoint one or more scientific correspondents for each bureau if it has not already done so. The relationship between the liaison officers and the scientific correspondents should be as close as practicable.

[28] It is not intended that the appointment of liaison officers or scientific correspondents should in any way interfere with the channel of communications between governments and the Executive Council."

* Viz., United Kingdom, Canada, Australia, New Zealand, Union of South Africa, Eire, Newfoundland, India, Southern Rhodesia, the Colonial Empire.

The point was this :—Whilst each bureau had and has in each country a scientist who acted as its “ official correspondent ” or “ general friend ” in scientific matters there was often no one whose business it was to be thoroughly *au fait* with the general principles, conception and working of the bureaux as a whole.

21. The Conference of 1936 felt that under the then prevailing practice, there was a certain risk of the various bureaux being regarded as a number of separate specialized agencies. The use made of the various bureaux by the different scientists in a country varied greatly for no apparent reason. The distribution of the bureau journals between countries and also between different scientific branches in the same country was uneven. It was hoped that liaison officers would be able to secure a wider knowledge and understanding of the bureaux and thereby a greater use of their services.

In the Colonial Empire, for instance, a liaison officer has been appointed in each colony or administration and the Agricultural Adviser to the Secretary of State for the Colonies has been nominated general liaison officer for the whole Colonial Empire. Preparatory to the Colonial Conference of Directors of Agriculture which was due to meet in London in July, 1938, each liaison officer in his country discussed bureau questions and the service the bureaux gave; so that at the Conference considered suggestions or criticisms could be made.

22. *Free distribution and sale prices of periodicals.*—The bureaux have always supplied institutes, offices and officers in contributing countries with a number of the periodicals free of charge. The lists of these recipients were compiled by each bureau in correspondence with its “ Official Correspondents ” subject to a general limit, laid down by the Council, on the total number which could be distributed free.

The Conference examined these lists. It found several anomalies, and decided to place the practice on a more equitable and systematized basis. In future—

(a) The countries themselves would decide which of their institutes, offices or individuals should receive free copies and of what periodicals.

(b) The total sale value of periodicals received free by each country should not exceed a fixed proportion of its contribution to the eight bureaux : viz., for every £150 of contributions as recommended by the Conference the value of one set of the periodicals issued by these bureaux.

(c) Within that total value each country should be free to select the periodicals best suited to its needs.

Preparatory to taking this action the Conference, however, recommended to the Council that the subscription rates to some of the periodicals of the bureaux could well be raised, but where that was done a reduced rate should be charged to subscribers in the British Commonwealth who order them direct from the bureaux.

23. During 1937-38 the Council—

(a) Recast the rates of the following journals :—

	Published price	Reduced rate to Empire subscribers ordering direct from bureaux
Review of Applied Mycology	s. 30	s. 24
Plant Breeding Abstracts	25	20
Herbage Abstracts	25	20
Horticultural Abstracts	25	20
Animal Breeding Abstracts	25	20
Soils and Fertilizers	25	20
Herbage Reviews*	15*	15*

* 5s. reduction if Herbage Abstracts also ordered.

(b) sent to each country for revision complete lists of the distribution of bureau periodicals in that country (both free and sale).

Replies are coming in during 1938-39.

24. There is a natural tendency to regard being on a "free" list as a sort of "privilege" which either one is lucky to attain or to which one is entitled as a right because some institute or individual of equal official standing has already been admitted to the free list of that or some other bureau. The revised list received from South Africa suggests that the question has not been regarded there as a distribution of a limited number of "boons," but has been approached in a different manner. A list was compiled of those institutes, offices and officers which in the opinion of the controlling department ought to receive these journals regularly at official cost. The cost of these was added up and the total value arrived at under para. 22 (b) was deducted as the discount to which South Africa, as a contributing government is entitled. Therefore the revised list sent in does not specify that the copy to be sent to "A" is to be regarded as a free copy, and that sent to "B" as one paid for at full rates. It simply says: "Here is the list of the institutes, offices and officers to whom we wish that copies of specified journals should be sent at our official cost. The total cost is £x. We are entitled as a contributor to a total of £y free. We deduct that and will pay £(x-y) for the lot". Some other governments are also following a similar plan.

25. The Council feels that this is putting this minor but rather troublesome matter of free distribution in its proper perspective. Free distribution is difficult to justify if it be regarded as a series of gifts to particular institutes or officers. Its justification is that it affords a means whereby the partners in a co-operative scheme (*i.e.*, the governments) can obtain at an average

cost well below that advertised, those publications which they consider their officers should have.

26. Looked at in this way it does make the cost of supplying official copies cheap. In the South African case it means that every month 47 institutes or officers, etc., will receive their abstract journals and that every quarter another 62 will receive their appropriate journals. In each case these are posted direct to the address given the day the journals issue. Yet the average annual cost to the South African department of supplying each of these 109 institutes or officers with its appropriate publication, postage included, is less than 5s. per recipient.

27. It is suggested that this method of approach may have some practical significance. It is common ground that—

(a) encouraging though sales have been—exceeding original expectations—the circulation of these journals is still below what it should be if scientists in the Empire are to derive full advantage from the services the bureaux provide;

(b) the bureau services—of which these abstract journals form a chief part—are of great value in promoting the efficiency of scientific officers.

An inescapable corollary follows, viz., the advisability of obtaining as wide and as useful circulation of these journals as possible among those institutes and officers who will profit from their use. How far, in order to promote the efficiency of their offices, governments and departments should go in supplying their institutes and officers with these journals at official expense is a local administrative matter. A line must be drawn somewhere. A free copy at government expense to every officer in service is as far towards one extreme, as taking one copy, circulating it round a number of scattered officers or offices and finally depositing it in some library is at the other extreme. The difficulty is, of course, in drawing the line. On this point administrative officers in different countries will naturally take different views. But it is suggested that the wider distribution which successive Conferences set out as the ideal, might be more nearly approached, if the habit spreads of regarding the free quota (it is now expressed in terms of money and not in terms of numbers of copies) as a discount to which governments are entitled in purchasing the publications which they need for their officers.

28. The difference in the method of approach lies in this. However the question is approached certain institutes and offices will naturally and rightly be given priority. There is no doubt they must have these publications and will make very full use of them. In truth they need little encouragement to get them. If there were no "free list" or "special discount to participating governments" they would almost certainly buy them at their full published price. Further, the representatives of some of those institutes have stated that the very full bibliographical services which the

bureaux provide enables them to economize to some extent on their own library services. That will vary, but it is possible. No one—least of all the bureaux—wishes to see the supply to these institutes rendered difficult, because it is to those institutes and senior officers that the bureaux look for so much constructive criticism and for so much aid and information. Yet whether they are regarded as getting their copies for nothing or for a very few shillings a year (*vide* the South African case above) can hardly make any practical difference to them. On the other hand, the apparent cost may well be a factor in determining whether another grade of officers, or institutes, whose position is not so outstanding, should or should not be supplied officially with these journals. It is suggested that regard should be paid to the average cost of obtaining all the copies required officially rather than to the particular cost of ordering those particular copies for those particular officers or institutes. What difference can it make to a senior research institute whether it gets a publication it must have for nothing, for 5s. or even for 10s. a year? Yet at that slightly additional cost it may be that the scientific interest of several officers in a junior grade can be so stimulated as to make them more competent to profit from the research work of that and of other institutes.

29. *List of Agricultural Research Workers in the British Empire.*—The Scientific Conference of 1936 recommended that this list should be continued to be published annually, but recast in two ways: (i) to show "the special line of study" on which each research worker was engaged, and (ii) by combining two sections of the list reduce its size. The collection of this additional information for the first time and the partial revision of the form of the list caused its issue to be later in the year than usual. The 1938 number is expected to be published to time.

30. *New Bureaux: Dairy Science.*—The Governing Body of the National Institute for Research in Dairying, Shinfield, near Reading, and the University of Reading agreed to the location of this new bureau at that Institute. Professor H. D. Kay, Head of the National Institute, was appointed Director of the bureau. The post of Deputy Director was advertised throughout all contributing countries and Mr. W. G. Sutton, M.Sc., senior lecturer in dairy chemistry and bacteriology, Massey Agricultural College, New Zealand, was selected. The Council was glad that candidates from overseas did apply and that one of their number was selected. A difficulty is apt to arise in selecting a candidate from a distance. If he happens to prove unsuitable or finds the work uncongenial he may find greater difficulty in obtaining work than if he had remained in his own country. The fear of this may at times deter suitable candidates from applying in the first instance. That risk has been removed in this case because the Massey Agricultural College has given Mr. Sutton a lien on his post there for one year. The Council is grateful to the College Authority for this action, which made the appointment of Mr. Sutton possible.

31. The advisability of bureau officers visiting contributing countries whenever practicable has frequently been stressed. The suggestion was made

and the Council readily agreed that Mr. Sutton should not travel direct to England but should come via Australia and the Union of South Africa, spending a little time in each of those countries, meeting the officers engaged therein on dairy research and in the dairy industry and learning something of local conditions. Both countries welcomed the suggestion, made arrangements to ensure that Mr. Sutton's visit should be comprehensive and instructive, and met his travelling expenses whilst in their respective countries. The Council is very grateful to the authorities in Australia and in the Union of South Africa, and to all those research institutes, dairy stations and officers who showed Mr. Sutton local conditions and work and gave him hospitable welcome. He states that he found the tour especially valuable, as without that he would inevitably have seen all dairy questions as with a New Zealand background—the only one with which up to then he was familiar.

32. *Forestry*.—It was not possible to start this bureau within the year. In the first place some of the decisions from some governments were not received until the year was well advanced, in the second the Council had to decide its location, and in the third the whole relations of Forestry with the University of Oxford were, throughout the year, being considered by a University Committee. After consultation with all governments the Council decided to locate the bureau at the Imperial Forestry Institute, Oxford, subject, of course, to the agreement of the University being obtained. That agreement was forthcoming and arrangements for starting the bureau were pushed forward so far as the enquiry then proceeding at Oxford would allow.

33. As the bureau could not be started in 1937–38 the Council naturally decided that the addition to the contributions provided for this bureau for that year could not be considered due. Those governments who had already paid were informed that payments would be carried forward as advance payments for 1938–39 (vide para. 5) and those governments which had so far not paid were informed that the addition to the contributions needed for this bureau were not required in 1937–38.

34. *Journal of Dairy Research*.—This journal had been started and supported by the Empire Marketing Board. When that Board was dissolved (1st October, 1933), the Council, with the approval of all governments undertook to meet any deficiency on the working of the Journal up to a limit of £250 a year. This contingent liability was to continue until the whole position could be considered at a Commonwealth Scientific Conference. The Conference of 1936 recommended it should cease when a bureau for Dairy Science should be started. The Council closed all financial liability towards this journal with effect from 31st December, 1937. Volumes V to VIII have issued during the Council's connection with the Journal and the number of subscribers has increased from 239 to 384.

35. The Journal has steadily improved in scientific standing and authority. Its financial management has been very economical. No free or exchange

copies are given. The Editors, who give their editorial services free, also subscribe for their own copies. The prospect of the journal becoming self-supporting is improving. The limit of the Council's guarantee—viz., £250 a year—was less than the deficiency which had had to be met in any previous year. Yet the total amount which the Council has been called on to pay over its four years' connection with the Journal has been £269 13s. 11d. or less than an average of £68 a year.

36. The financial position, however, is not yet assured. More subscribers are needed. At present whether a year's expenses are met or not depends solely on the fluctuating receipts from sales of back numbers and reprints. A guarantee against deficiencies on a year's working is therefore still needed. The Council is no longer authorized to give that guarantee. The Governing Bodies of the two leading dairy research institutes in Great Britain—the National Institute for Research in Dairying, Shinfield, Reading, and the Hannah Dairy Research Institute, Kirkhill, Ayr—have generously agreed to give it as a temporary measure. When the matter was being discussed intimation was received that, if necessary, one or two other leading dairy research institutes in countries overseas would be willing to join. This suggestion was greatly appreciated both as a testimony to the utility of the Journal and as showing a readiness among the institutes in the different countries to support a journal they value and to which they all contribute papers. It was hoped, however, that the financial position might continue to improve so that very soon the guarantee might not be needed or only called upon to a very small extent. If, unfortunately, this forecast proves incorrect it may be necessary to enquire from institutes overseas whether they would not also join these two institutes in giving the guarantee.

37. Changes in the Committee of Management of the Journal necessarily followed the changes in financial responsibility. For three years, 1938–40, it will consist of two representatives nominated by the two institutes which have given the guarantee, two members of the Executive Council and the Editors. The Council has no financial responsibility, but it has been closely associated with the conduct of the Journal. Moreover, those who are responsible for its issue are closely interested in the new bureau of Dairy Science. The Council has also agreed that for these three years its Secretary should act as Secretary to the new Committee of Management and finances of the Journal should be supervised by the Council's officers. By this means it is hoped to secure continuity in administration and the easy adjustment of any matters which in the earlier years may arise between the journal and the bureau.

D. The Imperial Institute of Entomology

38. The British Commonwealth Scientific Conference recommended increases in contributions from governments totalling £750 a year in each of the five years 1937–38 to 1941–42. Shortly after the Conference the Government of Eire notified an increase of £50 a year for the same period

in its contribution. These increases bring the total annual contributions from Empire governments to £13,442 a year. The total received in the year (*vide* audited statement attached) was £13,029 13s. 0d. which includes £125 outstanding from Australia on account of 1936-37.

The reconciliation between receipts and sums due is as follows :—

Contributions due in the year	£	s.	d.
Contributions due in the year	13,442	—	—
Outstanding from Australia from 1936-37	125	—	—
Total due	13,567	—	—
Deduct sum received at close of year too late for passing through the accounts of 1937-38	427	7	—
Actual receipts—audited statement	13,139	13	—
Outstanding not received at the close of the year	£	110	—

This sum of £110 outstanding at the end of the year is composed of £50 from Bahamas (since received) and £60 of the combined India-Burma contribution.

39. One of the chief reasons for the increase in contributions was to provide for two additional specialists to aid in the identification of specimens. The need for these appointments had been emphasized by the Imperial Entomological Conferences of 1930 and 1935. Dr. F. van Emden, who specializes on the Diptera and larvæ of the Coleoptera and Mr. G. E. J. Nixon, who deals with certain groups of Parasitic Hymenoptera were appointed to the staff of the Institute in November 1937.

40. The work on identification in 1937-38 and in the four previous years was as follows :—

	1933-34	1934-35	1935-36	1936-37	1937-38
Collections received for identification					
Number of senders	181	220	207	193	215
Number of specimens	106,700	80,733	101,728	116,783	108,179
Identifications made					
Number of lists issued	386	343	359	348	393
Number of names therein	8,287	9,401	7,270	7,767	8,517
Number handed to British Museum after identification	50,300	15,200	40,500	39,200	16,091
of which new to science	470	348	414	292	434
of which no named specimens were in the National Collection	833	739	614	439	914

From the collections received thousands of named specimens are, of course, returned to senders. As in the past, collections of named insects were also supplied to Universities or Colleges for teaching purposes or to research institutes.

41. The regular publications are—

Review of Applied Entomology—Series A. Agricultural.
 Review of Applied Entomology—Series B. Medical and Veterinary.
 Bulletin of Entomological Research.
 Zoological Record—Part Insecta.

The number of subscribers to Series B of the Review fell by five. For all the other publications the numbers were slightly above those in any previous year. Owing to this, to a good demand for back numbers and to the sale in the year of 66 copies of a book by Mr. T. H. C. Taylor on "The Biological Control of an Insect in Fiji," which had been published by the Institute in February 1937, receipts from sales of publications, £2,779 7s. 7d., exceeded those in any previous year. In the two foregoing years they realized £2,524 8s. 1d. and £2,446 8s. 4d.

In addition to these publications for sale, 38 original papers were published in scientific journals (29 and 31 in the two previous years). A list of these papers is given in the Director's report (Appendix I).

Reference is requested to that report. It gives a few samples illustrating the wide range—both in subjects and countries—of the enquiries which the Institute receives.

42. Accommodation for the Publishing Branch of the Institute had caused anxiety for some years. It became acute during the year. Temporary relief was afforded through the courtesy of the Imperial Institute allowing some records to be stored there. There is, however, now a very good prospect that the whole difficulty may be solved in the manner most desirable from every point of view, viz., by housing it ultimately in the Natural History Museum.

43. The Institute is also the International Centre for Anti-Locust Research. This work is not under the Council but is supervised by periodical International Conferences. The Director's report contains, as usual, a brief summary of the work done in the year in connection with Anti-Locust Research.

44. The year 1938 marks the twenty-fifth anniversary of the Institute. As such it possesses special interest not only for the Institute but also for the whole bureau organization. This was the first organization supported by all governments of the British Commonwealth to be formed for the collection and dissemination of scientific information and for assistance in the identification of specimens. It owes its constantly increasing usefulness, and its position as the accepted centre for information on Applied

Entomology primarily to the work of Sir Guy Marshall and Dr. S. A. Neave, who have directed its work since the beginning. Their long association in this work has given it the continuity essential for success and has ensured the continuance of the confidence of entomologists throughout the Empire which they rapidly gained. Without that support they must have failed. The Council cannot allow this anniversary of a successful pioneer effort to pass without a tribute to the work of those two officers who are known personally to so many of the fellow entomologists in the Empire and without recognition of the support which those entomologists have given to the Institute in its developments throughout its first twenty-five years.

E. The Imperial Mycological Institute

45. The British Commonwealth Scientific Conference recommended that with effect from 1st April, 1937, contributions should be increased by £600 a year, to which also shortly afterwards the government of Eire added a further £50—making a total increase of £650 a year. Contributions from Empire governments therefore total £7,900 a year for each of the five years 1937–38 to 1941–42.

Against this sum £7,255 was received in 1937–38. The reconciliation between the two figures is as follows :—

Due for the year 1937–38	£	7,900
Due from Australia for 1936–37	75	
	<hr/>	£7,975
Deduct amount received at end of year but not cleared when accounts were closed	210	
	<hr/>	£7,765
Deduct balance outstanding at the close of the year ..	510	
	<hr/>	£7,255

The outstanding balance of £510 is made up as follows: £50 from the Bahamas (since received), £400 from Nigeria, and £60 on the India-Burma contribution.

46. Reference is requested to the Director's report (Appendix II), which shows increased work in every branch of the Institute—investigation, identification, collection and dissemination of information and enquiries. Also, at the request of the Secretary of State for the Colonies, Mr. Dade visited the Gold Coast from May to July to investigate and advise upon a swollen shoot and dieback disease in cacao.

The need for investigation into the more obscure species and genera has been explained in the reports of previous years. Without it identification is often impossible. In the year, Dr. Wiltshire, Mr. Mason and Mr. Dade all made progress in the groups which they were especially investigating—the

Alternaria, the Fungi Imperfecti, heterothallism in *Ceratostomella* (*Ophiostoma*) *paradoxa*. The Director states that in the third fascicle of List II of the "Annotated Account of Fungi received at the Imperial Mycological Institute," which was issued during the year, Mr. Mason has attempted to establish a more correct method of classifying and naming the Fungi Imperfecti and one more suited to the needs of applied mycology.

47. Requests for help in identification were very numerous. Specimens and cultures, many phytopathogenic, were received in the year for identification from almost all contributing Empire countries. In some cases the Director describes these receipts as comprising "notably large numbers." All the scientific members of the staff aided in this work, and, as has been the case in the past, aid by experts not on the Institute Staff was also given. In this connection the Director mentions Mr. R. H. Bunting and Mr. T. Petch, Dr. H. W. Gordon in Winnipeg, and Dr. H. W. Wollenweber and Mr. H. Sydow in Berlin. The Council acknowledges with thanks the expert assistance given to the Institute by these and other specialists.

48. Correct identification is a necessary stage in determining the distribution of fungi and their treatment. Through the assistance which the Institute has given, mycologists in a number of the Colonies and Dependencies have been able to publish lists of diseases on the economic plants in their countries. In the year an "Annotated host list of Uganda parasitic fungi and plant diseases," and "A first list of Cyprus fungi" were issued; and "A preliminary list of plant diseases in Nigeria" was published in the Kew Bulletin of Miscellaneous Information. Also the National Research Council of Canada is issuing as a special bulletin a very comprehensive annotated list of the "Fungi of Manitoba and Saskatchewan" to which Dr. Bisby is the main contributor and which he has seen through the Press. The publication of the "Annotated Account of Fungi received at the Imperial Mycological Institute, List II, Fascicle 3" has already been mentioned.

49. General enquiries also were somewhat in excess of those in the previous year :—

	1935-36	1936-37	1937-38
Letters despatched—excluding all those connected with the Review	1,713	1,630	1,915
Of which replies to specific enquiries for information exceeded	600	500	700
Reprints and books loaned	114	166	155

50. *The Review of Applied Mycology*.—The year 1937 was the sixteenth year of publication of the journal. The number of papers abstracted, viz. 1,951, exceeded the highest previous total. The price of the journal was

revised (*vide* para. 23 above). The total distribution in March, 1938 (including free copies), being 974 as against 950 a year previously.

As a result of this increase in the rate of subscription, receipts from the sales of publications for the first time covered the cost of printing and distribution—receipts of £960, against a cost of £950.

The receipts from sales of publications over the last five years have been as follows :—

Receipts from sales of publications					
		£	s.	d.	
1933-34	.. ..	589	6	5	1936-37 698 11 3
1934-35	.. ..	676	5	7	1937-38 960 12 4
1935-36	.. ..	697	19	3	

51. The report of 1936-37 contains the following sentence about this Institute. "In every branch of the Institute's work the year was one of increased activity and increased output." That is true of 1937-38. Work is still coming in increasing volume and additional help will almost certainly be needed. The improvement in the financial position has only come just in time and may well prove no more than barely sufficient.

F. The Laboratory for the Biological Control of Insect Pests— Farnham House

52. The British Commonwealth Scientific Conference recommended that this Laboratory should be organized on a co-operative inter-Imperial basis with a financial provision of £5,025 a year for the five years, 1937-38 to 1941-42. To this shortly afterwards the Government of Eire added £50, making the total annual contribution of £5,075. Receipts from Governments in the Empire amounted in the year to £4,809 10s. 9d. The reconciliation between these two figures is as follows :—

	£	s.	d.
Contributions due in 1937-38	5,075	0	0
Received in 1936-37 but not cleared before accounts were closed	25	12	6
Total	5,100	12	6
Less received within the year but not cleared before accounts were closed	214	17	11
	4,885	14	7
Amount outstanding at close of the year	76	3	10
	£4,809	10	9

Of the amount outstanding £3 9s. 9d. has since been received. The balance, £72 14s. 1d., consists of 4s. 1d. due from the Windward Isles, £12 10s. from Australia, and £60, being 10 per cent. of the India-Burma contribution.

53. All the contributing countries (taking the Colonial Empire and India-Burma in each case as one), except the Union of South Africa, asked for and received shipments of beneficial parasites during the year. Work was also expected from South Africa and some preliminary investigation was started with a view to it, but the final order did not come. The total number of shipments and number of beneficial parasites shipped were far below those of the extraordinary figures of 1936-37.

	No. of shipments.	No. of parasites sent.
Six and a half years from beginning of Laboratory to 30th September, 1933	304	Mills. 1.85
Six months October, 1933, to March, 1934	45	0.78
1934-35	166	5.30
1935-36	116	3.13
1936-37	182	22.34
1937-38	100	4.56

The decrease as compared with 1936-37 is due to the cessation of certain types of work in which large masses of material were available for collection, notably, the work on one of the Pine Sawflies and the Ragwort seedfly, which in 1936-37 had provided 21.55 mills. out of the total 22.34 mills. despatched. Requests were received for other material not so profusely available, and the staff was kept fully occupied throughout the year.

54. In his report (Appendix III) the Director mentions some of the more interesting insect pests for the control of which the Laboratory was asked to procure parasites. One of the more curious shipments was a consignment of Giant Toads to Mauritius. These were procured from Porto Rico through the courteous help of a representative of the United States Bureau of Entomology, repacked, attended to at Farnham House, and sent to Mauritius, where they were released against sugar cane white grubs.

55. The Laboratory is becoming increasingly recognized as a scientific centre, as is shown by the list of those who have visited it and worked for a time in it. A very useful visit, in view of the amount of work the Laboratory has been doing for Canada, was that by Mr. A. B. Baird, Director of the Dominion Parasite Laboratory, Belleville, Ontario. He went thoroughly into the common work of the two laboratories, and later Dr. Thompson accompanied him on a short tour through areas where entomological work was in progress in France, Holland, Germany, Czechoslovakia, Hungary and Austria.

56. The finance of the Laboratory depends on (a) contributions (*vide* para. 52 above), and (b) charges for work undertaken. The reason for this dual system is as follows :—

(a) By contributions to ensure that a Laboratory properly equipped for this work under an expert Director and with a small nucleus trained scientific staff should be available for this work as and when required, and

(b) Through charging fees for work done

(i) to keep annual contributions at as low a figure as possible, and

(ii) gradually to bring total payments (contributions and fees) into some sort of relationship to the extent to which the Laboratory is used by different countries.

Clearly with only fees and no contributions the Laboratory could not exist, unless departments—

(a) sent in their requests many months earlier than they do ;

(b) were prepared to pay full costing costs on the work desired ;

(c) sent sufficient money in advance fully to finance the work, instead of paying mostly on bills rendered after the work is done ;

(d) sent sufficient orders on those terms to keep the staff fully employed throughout the whole year.

Such conditions alone would give the certainty of employment required to retain a trained staff and funds to meet outgoing charges as they arose.

For these reasons every country has accepted the necessity for a system of contributions. Also every country agrees that charges for work should be made.

57. The system is now much better understood than when it was introduced in April, 1934. But two perplexities are still at times heard. They are these :—

(i) If we are supporting the Laboratory by contributions and also paying fees when we want some specific work done we are paying twice over.

(ii) If the Laboratory is earning fees by charging, it must have a surplus which should by this time have been applied in reducing contributions.

Both contentions seem plausible but they arise from :—

(a) a misconception of the scale of fees charged and consequently of the amount which the Laboratory can and does earn thereby ; and

(b) a failure to realize that owing to these earnings contributions from 1st October, 1933 to 31st March, 1937 have been some 14 per cent. and 15 per cent. below what they otherwise would have been.

58. Prior to 1st October, 1933 neither was this work organized on an inter-Imperial basis (therefore there had been no contributions) nor had any

fees been charged for specific work undertaken. To have sought in the early years both

(a) contributions sufficient each year to meet fully the inevitably growing cost, and

(b) the payment of fees on a full costing basis would undoubtedly have caused a rapid reduction in contributions, if a full year's work had been forthcoming immediately and continued on that basis, but that work would have appeared so immediately expensive that it was very possible that departments (which had hitherto paid nothing at all) would hesitate (and perhaps fail) to send any orders.

59. When considering the position in 1933 the Council took the view that this biological control work was an instrument in the armoury of the economic entomologist which in many countries had only so far been partially tried, was likely to be tried more, and was on occasion likely to be very badly needed. A properly equipped Laboratory under expert direction should therefore be supported inter-Imperially. As regards its finance it did not attempt to equate the cost each year against those for whom work had been done, but looked at contributions and fees as a whole, whereby the contributions might be regarded as a sort of "insurance" *præmia* which should be kept as low as reasonably consistent with the safe retention of the Laboratory and the fees charged should also be reasonable, below full costing. As receipts grew further reductions in the annual "*præmia*" (contributions) should become possible.

60. The contributions were put at £5,035, which was below the minimum cost of the Laboratory, and were kept there in spite of the increasing cost in subsequent years due to the operation of increments, replacement of equipment, etc.

Fees were not to be charged on a costing basis, but were to be

(a) half the salary of the staff employed on the work for the time they were so employed;

(b) 5 per cent. on that salary charge and also 5 per cent. on any special outgoings (other than on travelling expenses) incurred in that work;

(c) recovery of such special outgoings and travelling expenses.

Of these constituents in the "fee" the only ones which enure to the benefit of the Laboratory (and therefore are available for meeting increasing annual costs and for possible reductions of "*præmia*"—*i.e.*, contributions) are (a) the recoveries of half salary, and (b) the 5 per cent. charge.

Those engaged on specific work are usually assistants. Quite clearly 5 per cent. on half the salaries of assistants (or even on the whole salaries) and on a few special outgoings can go only a little way towards meeting the salary of the Director and the full maintenance charges of the Laboratory.

Also, quite clearly, in so far as part of the cost of the maintenance of the Laboratory is met from the contributions of countries which have not sent work to the Laboratory, the countries which have used the Laboratory have not only not paid twice over, but have not paid the full true costing of the work done. (It is arguable, of course, to say with reference to some particular piece that they have had the use of a more fully equipped Laboratory than in that case might be needed, but that is not paying "twice" over and the time may come when for some other work a Laboratory so equipped and so staffed may be needed.)

61. There remains the second criticism that these charges were designed to yield some receipts and must have done so, yet that result has not been reflected in any reduction in contributions ("præmia"). What is overlooked here is that—

(i) the contributions were originally fixed and kept well below the previous average annual cost of the Laboratory: viz. £5,035 a year as compared with an average cost over the previous five years of £5,846.

(ii) contributions and fees were only asked and collected with effect from 1st April, 1934 although the Council (and therefore governments) has been liable for all costs since 1st October, 1933.

(This meant that the Council started on 1st April, 1934 with a debt of £1,353 19s. 2d., the clearance of which was a first charge on any accumulated surpluses.)

(iii) recoveries to the Laboratory from fees calculated on a basis of half the salaries of a small nucleus staff plus 5 per cent. only reach an appreciable sum slowly.

62. The financial results between 1st October, 1933 and 31st March, 1937 were as follows:

	Receipts from contributions	Expenditure	Difference on year period	Accumulated Difference
1st October 1933—	£ s. d.	£ s. d.	£ s. d.	£ s. d.
31st March 1937.. ..	Nil	1,353 19 2	— 1,353 19 2	— 1,353 19 2
1934-35	5,035 — —	5,046 19 5	— 11 19 5	— 1,365 18 7
1935-36	5,035 — —	5,237 9 11	— 202 9 11	— 1,568 8 6
1936-37	5,009 7 6(a)	5,624 4 6	— 614 17 —	— 2,183 5 6
Total, 3½ years ..	£15,079 7 6	17,262 13 —	—	— 2,183 5 6

Note (a). A short payment of £25 12s. 6d. in the year see para. 52.

This shortage of £2,183 5s. 6d. in three and a half years between contributions and expenditure was made good by fees. Had no fees been charged contributions would have

been 14½ per cent. higher than they have been. That is the measure by which receipts from fees have reduced contributions over this period. Those receipts have been as follows:—

Receipts by the Laboratory

	Fees for special work			Rent, sales, miscellaneous			Total			Running total		
1st October 1933—	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
31st March 1934	105	5	6(a)	Nil			Nil			105	5	6
1934-35	322	15	6	127	16	3	450	11	9	555	17	3
1935-36	831	1	8	156	15	1	987	16	9	1,543	14	—
1936-37	1,024	14	6	111	8	3	1,136	2	9	2,679	16	9

Note (a). A prepayment for work to be done in 1934-35. The Treasury in the United Kingdom advanced the funds needed for the six months October, 1933 to March, 1934 and the debt of £1,353 19s. 2d. shown in the first of these tables was the balance due to the Treasury after crediting it with all receipts attributable up to 31st March, 1934.

It will be seen from these two tables that though receipts from fees expanded each year it was only in 1936-37 that the Laboratory became solvent. The financing of the Laboratory between October 1933 and March 1937 was rendered possible by His Majesty's Treasury being willing to wait for payment of its claim until accumulated funds permitted. This position was reached at the end of the year 1936-37. The debt was repaid in 1937-38 (*vide* audited statement attached).

63. The results may be summarized as follows:

Average annual maintenance cost (excluding capital expenditure) on Laboratory in the five years 1928-29 to 1932-33 (<i>i.e.</i> in pre-Council days)	£5,846	5	6
Average annual maintenance cost in the three and a half years October 1933 to March 1937	£4,932	3	8
Average annual total contributions asked for in those three and a half years	£4,315	14	3

Contributions in those three and a half years averaged £616 a year less than the average annual cost incurred and £1,530 a year less than the average annual cost in the five years ending March 1933.

64. These financial arrangements have been set out in full because the attainment of solvency marks a stage in the history of the Laboratory and because in some countries their results have appeared to be obscure. The low level at which contributions were put (anticipating in advance some of the relief which would accrue from the introduction of a system of charges) and the low scale of those charges (with consequent slowness in yielding appreciable sums towards the credit of the Laboratory) was not apparently realized.

The British Commonwealth Scientific Conference approved of the system in force but recommended that charges should be based on the full salary, plus 5 per cent. instead of half salary plus 5 per cent. This is fairer as it renders the charge made independent of the chance whether the officer put on to a project happens to be one of the "nucleus" staff or not. The 5 per cent. on full salary though twice as advantageous as 5 per cent. on half salary can yet obviously go but a little way towards the cost of the Director's salary and Laboratory maintenance.

65. The Council introduced these new scale charges with effect from the 1st April 1937. As the statement of accounts shows receipts in 1937-38 were as follows :—

	£	s.	d.
Receipts from fees on special projects	1,914	12	11
Receipts from rent, sales and miscellaneous	124	8	0
	<hr/>		
	£2,039	0	11
	<hr/>		

The receipts include the payment of bills outstanding at the close of 1936-37 amounting to £417 9s. 8d. and payments in advance for work to be done in 1938-39 amounting to £24 16s. 2d. On the other hand bills amounting to £61 8s. 3d. were outstanding at the end of the year.

66. The financial results of the year's working in 1937-38 are as follows excluding the provision for and repayment of the debt :—

Receipts				Payments			
		£	s. d.			£	s. d.
Opening Balance		496	11 3	Expenditure		5,453	0 7
Contributions		4,809	10 9	Closing balance		1,892	2 4
Fees, rent, sales, etc. ..		2,039	0 11				
		<hr/>				<hr/>	
		£7,345	2 11			£7,345	2 11
		<hr/>				<hr/>	

Whether as a result, any rebate can be made, in the next year's contribution will be considered by the Council at the time of the estimates for 1939-40 in the light of the then position and of the prospect of future work. Some indications suggest that departments were not prepared for the increase in the scale of charges resulting from the recommendation of the British Commonwealth Scientific Conference. It is hoped that this full statement will make the position clearer. The fact is, that it is only by sending work to the Laboratory that the contributions can ultimately be reduced.

G. Potato Expedition to the Andes

67. The object of this expedition and the story of its inception is given in paragraphs 17 and 18 of the report for 1936-37. Briefly, it is an exploratory botanical expedition financed jointly by all governments of the British Commonwealth. Its object is to obtain new material required by plant geneticists for their work in breeding strains with greater resistance to disease and better suited to their local climatic conditions. Recent scientific work shows that the most promising source of such material is the high Andes and in the mountains of Mexico. The expedition was to have started in January 1938 under the leadership of Dr. P. S. Hudson of the bureau of Plant Breeding and Genetics. Dr. Hudson was too ill to go. With the approval of governments the expedition was postponed for a year—*i.e.* to the winter of 1938-39.

68. A new leader had to be found. The Council have been able to secure the services of Mr. E. K. Balls who has had much experience of plant collecting in Russia, the Caucasus, Siberia, Persia, Morocco, Eastern Asia and Greece and who, in the spring of 1938, was starting with Dr. W. B. Gourlay on a plant-collecting expedition to Mexico. He will be free to go to the Andes after his work in Mexico. It was arranged that, on payment of a small contribution (possibly not exceeding £25), Mr. Balls and Dr. Gourlay would during the summer of 1938, collect for the Council specimens of Mexican potatoes from the areas they had arranged to visit.

69. Mr. J. G. Hawkes had been engaged as assistant to Dr. Hudson. Arrangements were made, outside the Council, whereby, throughout 1938, Mr. Hawkes would study and work on the genetical problems of potatoes under Dr. R. N. Salaman, F.R.S., Director of the Potato Virus Research Institute, Cambridge, and would thereafter accompany Mr. Balls on the South American expedition. He is thus obtaining much knowledge which should be of use to him on that expedition.

70. The postponement of the expedition has been an advantage. It has enabled better arrangements to be made for handling the material on arrival, classifying and describing it and then despatching to the contributing countries. The mere collection and despatch of it undescribed and unclassified to contributing countries would result in losses of specimens, confusion, much needless duplication of work and much uncertainty. Yet for classification and propagation greenhouses in which light as well as heat could be controlled were needed; also expert scientific knowledge and experience on potato breeding. Three parts of the Empire are now co-operating in this preliminary scientific work, *viz.* the United Kingdom through the two potato stations, the Potato Virus Research Institute at Cambridge, and the Potato substation of the Scottish Society for research in plant breeding, Corstorphine, Edinburgh; Canada, through the Division of Botany in the Dominion Experimental Farms

Branch; and Trinidad. This scientific essential work will be under the expert direction of Dr. Salaman, Mr. Robb, Dr. Güssow and Mr. J. B. Hutchinson. The bureau of Plant Breeding and Genetics at Cambridge will maintain records of the descriptions, characters and classifications thus given to the material received and of the ultimate distribution. Thus, whilst properly staffed and equipped research stations have undertaken the scientific work, the bureau will have available a complete record and be responsible generally for the distribution of the potatoes to contributing countries.

71. The Council is very grateful to those scientists, to the departments, universities and research institutes to which they belong for undertaking this laborious, but essential scientific work. The co-operative character of this effort is widening. For all governments to combine together to send out a botanical exploratory expedition was in itself something new. And now scientists specially suited by their knowledge and experience are voluntarily co-operating to ensure that the material obtained will be classified on a common plan, grown on and distributed.

72. This preliminary scientific work will take at least two years and possibly three to complete. Sufficient glasshouse accommodation was not available at Cambridge. That difficulty has been met through the assistance of the Ministry of Agriculture and of the Royal Horticultural Society. The Ministry has made a large and very convenient greenhouse available, by building another elsewhere and transferring to it the research work carried on in the older one which was especially suited for this potato work. None of that capital cost has fallen on the Council, but the Council will meet from its "Potato Expedition" Fund the cost of maintenance during the first two (and possibly third) years of the work. The Royal Horticultural Society has placed freely at the disposal of the Council for three years for this work another smaller greenhouse close by this large one, the only condition being that the Council would bear the cost of making it possible to control absolutely the light entering it. The Council agreed. The Council have been generously helped in surmounting the difficulties which close examination of the problem showed. Arrangements are much better than a year ago.

73. Plant geneticists in Empire countries have not, however, had to wait until 1939 or 1940 for some of this South American material. The zoological expedition sent out from Cambridge University to Lake Titicaca (South Peru) in March, 1937, knowing that Empire countries were interested in potatoes, kindly brought back a number of specimens and gave them to the bureau. Dr. Salaman has since grown them on and many have been distributed. Specimens are now (the summer of 1938) being received from Mr. Balls, from Mexico. It looks, therefore, likely that throughout the next two or three years new genetical material will be steadily distributed to plant breeders in Empire countries.

H. Research Schemes

I. Low Temperature Research

II. Wool Research—Torridon

74. In respect to the contributions which certain governments have made through the Council to research in the United Kingdom into the preservation and transport at low temperatures of foodstuffs and into the uses of wool, the British Commonwealth Scientific Conference recommended as follows :—

“ Low Temperature Research : These contributions should be, as at present, a matter for arrangement between the individual governments concerned, to be dealt with as hitherto, and it is undesirable to formulate any general principles concerning them ”—*i.e.* they would have to be determined year by year.

“ Wool Research, Torridon : Governments should be invited to consider favourably the possibility of continuing as an interim measure, pending further examinations, the payments (totalling £2,000 a year) which they are at present making through the Executive Council for work done by the Wool Industries Research Association.”

75. The contributions agreed by the governments concerned for 1937–38 were as follows :—

Low Temperature Research : Australia (£3,000), New Zealand (£2,000), Union of South Africa (£850), and Southern Rhodesia (£50) Total £5,900

Wool Research—Torridon : United Kingdom (£300), Australia (£1,000), New Zealand (£300) and Union of South Africa (£400) Total £2,000

Note.—In addition to these figures, the United Kingdom, through the Department of Scientific and Industrial Research, spent £38,998 on Food Investigation research in 1936–37 and contributed to the Wool Industries Research Association £5,750.

These sums due through the Council (*viz.* £5,900 and £2,000) were received in the year and paid over, except that the Australian contribution for Wool (£1,000) was received and paid to the Wool Industries Research Association in June, 1938.

76. Low Temperature Research is under the direct control of the Department of Scientific and Industrial Research. Representatives of contributing governments continued through the year to serve on its Food Investigation Board, which is closely associated with that work. That Board has issued a full report on the work in the calendar year 1937 which has been circulated to all contributing countries.

The representatives of contributing countries are represented on the Wool Fibre Research Committee of the Wool Industries Research Association—Torridon. The report of the Association has been published and circulated.

In the early months of 1937 a special Wool Conference was held in Australia attended by representatives from New Zealand and South Africa. One of its functions was to consider the organization necessary to control funds provided by those three countries from the wool industries and government grants, for publicity to promote the use of wool and for research into the uses of wool. As a result the International Wool Publicity and Research Secretariat has been organized. It opened an office in London under representatives of the three Dominions interested in the early months of 1938. They also are now in close association with the Wool Industries Research Association—Torridon.

77. The Imperial Committee on Economic Consultation and Co-operation recommended that where governments, after consideration, undertook to support co-operatively research schemes previously financed from the Empire Marketing Fund, that joint liability should date from 1st October, 1933. After report by the Executive Council three schemes came under this arrangement—Farnham House Laboratory, Research into Insect Infestation of Stored Products (Slough) and Low Temperature Research. In the first instance contributions were only asked for with effect from 1st April, 1934—governments being asked later for the arrears for the six months 1st October, 1933, to 31st March, 1934. For the liquidation of this debt on Farnham House, *see* para. 62 above. With the exception of New Zealand all governments had before the end of 1937-38 paid their shares of the arrears on the other two schemes. The amount due from New Zealand (Low Temperature Research, £1,500, and Research into Insect Infestation of Stored Products, £31 5s. 9d.) has been received since the close of the year and paid over.

All debts appertaining to those research schemes for those six months have been discharged.

I. Chairman and Vice-Chairman

78. With the adoption of this report Mr. Nevill Wright's (New Zealand) period of two years' office as Chairman of the Executive Council has come to an end. Lt.-Col. G. P. Vanier, D.S.O., M.C. (Canada), has been elected Chairman and Mr. F. J. du Toit (Union of South Africa) Vice-Chairman.

NEVILL L. WRIGHT,
Chairman.

ACCOUNT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31ST MARCH, 1938.

I have examined the above Account. I have obtained all the information and explanations that I have required, and I certify, as the result of my audit, that in my opinion the above Account is correct. (Signed) G. C. UPCOTT,

(Signed) W. G. IVES, *Accountant.*
(Signed) DAVID CHADWICK, *Secretary.*

IMPERIAL INSTITUTE OF ENTOMOLOGY.

ACCOUNT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31ST MARCH, 1938.

Receipts.		Payments.			
	£ s. d.		£ s. d.	£ s. d.	
Balance on 1st April, 1937	.. .. 5,376 19 4	Salaries, Director, etc.	.. ..	2,400	- - -
Less adjustment of F.S.S.U. Suspense A/c.	.. .. 16 13 4	F.S.S.U. contributions.	.. ..	240	- - -
		Salaries, Scientific staff	.. ..	6,637	- 5 -
Contributions from :—		F.S.S.U. contributions..	.. ..	602	10 - 4
Empire Governments	.. .. 13,029 13 -	Salaries, whole time staff	.. ..	2,415	3 4 -
Foreign Governments	.. .. 475 10 5	F.S.S.U. contributions..	.. ..	221	2 6 -
Societies .. ..	.. .. 205 - -	Salaries, part time staff	.. ..	58	2 11 -
Interest and Dividends	.. ..	National Insurance	.. ..	17	17 9 -
Sales of Publications	.. ..	Travelling expenses	.. ..	-	12 2 -
		Books, Publications	.. ..	125	11 - -
		Bulletins .. ..	.. ..	1,918	12 8 -
		Stationery, Postages, Telephones	.. ..	180	12 9 -
		Rent, Rates, Insurance	.. ..	347	2 8 -
		Housekeeping, Heat, Light, Water, Cleaning	.. ..	325	16 5 -
Redemption of £1,000 Natal 4% Stock, 1937; cost	.. .. 943 16 6	Laboratory Equipment	.. ..	9	18 6 -
plus profit on redemption	.. .. 56 3 6	Contingencies	.. ..	17	13 8 -
		Furniture .. ..	.. ..	2	14 6 -
Less purchase of :—		Audit Fee .. ..	.. ..	25	- - -
£1,040 5 2 Queensland 3% Stock	.. .. 1,000 - -			15,540	11 3 -
1922/47 .. ..	.. ..	Balance on 31st March, 1938 :—			
		Joint Colonial Fund	.. .. 6,000	- - -	
		Crown Agents for the Colonies	.. .. 542	10 4 -	
		H.M. Stationery Office	.. .. 200	- - -	
		F.S.S.U. Suspense	.. .. 73	- 9 -	
				6,815	11 1 -
		Less :—			
		Due to Sir Guy Marshall..	4 6 2		
		Widows' and Orphans' Ins.			
		Employees' contribu-	13 4		
		tions		4 19 6	
				6,810	11 7 -
				£22,351	2 10 -

Investments at 31st March, 1938:				£	s.	d.
£1,040	5	2	Queensland 1922/47 Stock 3% at cost ..	1,000	-	-
£1,000	-	-	Cyprus 1936/86 Stock 4% at cost ..	950	-	-
£2,679	19	-	Funding 1960/90 Stock 4% at cost ..	1,869	12	6
£1,000	-	-	Jamaica 1952/62 Stock 4% at cost ..	940	-	-
£1,017	16	8	Kenya 1961/71 Stock 4½% at cost ..	998	15	-
£1,000	-	-	India 1950/55 Stock 4½% at cost ..	936	7	-
£1,000	-	-	Nigeria 1963 4% at cost ..	881	7	-
<hr/>				£7,576	1	6
£8,738	-	10				

I have examined the above Account. I have obtained all the information and explanations that I have required, and I certify, as the result of my audit, that in my opinion the above Account is correct. (Signed) G. C. UPCOTT,
Comptroller and Auditor General.

(Signed) GUY A. K. MARSHALL, Director.
(Signed) W. G. IVES, Accountant to Council.
(Signed) DAVID CHADWICK, Secretary.

21st June, 1938.

IMPERIAL MYCOLOGICAL INSTITUTE, FERRY LANE, KEW, SURREY.

ACCOUNT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31st MARCH, 1938.

Receipts.		Payments.	
	£ s. d.		£ s. d.
Balance on 1st April, 1937	2,313 11 -	Director's salary	1,170 16 8
Contributions	7,480 - -	Superannuation	120 - -
Dividends and Interest	137 7 10	Scient. and Tech. Staff Salaries	4,053 9 9
Publications	960 12 4	Superannuation	394 6 8
Refund of duty on spirit	4 13 7	Clerical Staff Salaries	753 1 4
		Superannuation	34 12 -
		Laboratory Attendant	189 11 8
		Superannuation	17 10 -
		Overtime	6 13 -
		National Insurance	17 2 6
		Travelling	1 14 10
		Purchase of books	83 4 11
		Issue of Publications	950 11 5
		Stationery, postage, telephone, etc.	75 19 3
		Rent, rates, insurance	105 19 -
		Light, heat, water, cleaning, etc.	210 18 10
		Laboratory apparatus	55 7 7
		Contingencies	2 19 2
		Audit	20 - -
		Equipment	26 5 8
		Redecoration	132 14 -
			£8,422 18 3
		Balance on 31st March, 1938:	
		Joint Colonial Fund	2,000 - -
		Crown Agents	382 7 1
		Bank	23 15 3
		Cash	7 3
		Stamps	5 16 9
		F.S.S.U. Suspense Account	61 - 2
			2,473 6 6
	£10,896 4 9		£10,896 4 9

Investments on 31st March, 1938:
£2,077 15s. 4d. New Zealand 4½% 1944 at cost £2,000

(Signed) S. F. ASHBY, Director.

(Signed) W. G. IVES, Accountant to Council.

(Signed) DAVID CHADWICK, Secretary.

28th June, 1938.

I have examined the above Account. I have obtained all the information and explanations that I have required, and I certify, as the result of my audit, that in my opinion the above Account is correct. (Signed) G. C. UPCOTT,

Comptroller and Auditor General.

ACCOUNT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31ST MARCH, 1938.

37

IMPERIAL INSTITUTE OF ENTOMOLOGY—continued.

	General A/c.		Capital A/c.	
	£	s. d.	£	s. d.
Balance on 31st March, 1938:				
Crown Agents for the Colonies	817	12 2		
Joint Colonial Fund	1,000	- -	200	- -
Deposit with Bank			57	17 -
Superintendent, etc.		59 6 3		
F.S.U.		15 3 11		
	£1,892	2 4	£257	17 -
	<hr/>		<hr/>	
	- £8,956 19 1		2,149 19 4	
	<hr/>		<hr/>	
			£8,956 19 1	

I have examined the above Account. I have obtained all the information and explanations that I have required, and I certify, as the result of my audit, that in my opinion the above Account is correct. (Signed) G. C. UPCOTT,
Comptroller and Auditor General.

(Signed) W. R. THOMPSON, Superintendent.
(Signed) W. G. IVES, Accountant to Council.
(Signed) DAVID CHADWICK, Secretary.

22nd July, 1938.

APPENDIX I

IMPERIAL INSTITUTE OF ENTOMOLOGY
REPORT FOR 1937-38

During the 25th year of its existence the activities of this Institute have continued their steady development, and one of the most important issues that has arisen has been the question of accommodation of the Publication Office, which has now outgrown its present quarters. For 18 years this department has been housed most satisfactorily in the building owned by the Royal Entomological Society of London, but the growth of our library and of the unissued stocks of our publications has produced such a state of overcrowding that a move has become imperative. Most fortunately it has been possible to come to an arrangement with the authorities of the British Museum (Natural History) who have very kindly offered us ample accommodation in the new entomological wing that is shortly to be added to the Museum. It is doubtful, however, whether it will be possible to effect the change in less than two years. Although the termination of our long and friendly association with the Entomological Society is to be regretted, the new arrangement will certainly be a most convenient one.

Identification of Insects.

During the year under review the number of specimens received amounted to 108,179, as compared with 116,783 in the previous year, and an average of 98,652 for each of the five years before that. These insects were sent in by 215 (193) different correspondents, who were geographically distributed as follows:—Africa 58 (44), America 24 (26), Asia 52 (41), Europe 61 (58), Oceania 20 (24), all the numbers in brackets being those for the previous year.

The lists of identifications sent out totalled 393 (348), comprising 8,517 (7,767) specific names. The actual numbers of identifications sent to the various Dominions, Colonies and other territories are as follows:—

AFRICA	Union of South Africa	156	(177)			
			Southern Rhodesia	..	..	17	(72)	
			Sudan	..	..	265	(199)	
			Gold Coast	..	..	97	(25)	
			Kenya	..	..	1,110	(870)	
			Nigeria	..	..	239	(203)	
			Nyasaland	..	..	46	(45)	
			Sierra Leone	..	..	154	(345)	
			Uganda	..	..	472	(298)	
			Tanganyika Territory	..	..	86	(263)	
			Other Territories	509	(536)			
								3,151	(3,033)	
AMERICA	Canada	9	(51)			
			West Indies	..	..	265	(397)	
			Other Territories	..	..	467	(210)	
								741	(658)	
ASIA	India and Burma	955	(934)			
			Ceylon	..	..	19	(37)	
			Cyprus	..	..	149	(82)	
			Malaya	..	..	613	(430)	
			Palestine	..	..	574	(498)	
			Other Territories	..	..	778	(996)	
								3,088	(2,977)	

OCEANIA	Australia and New Guinea ..	413	(315)		
	New Zealand	107	(64)		
	Fiji Islands.. ..	156	(16)		
	Solomon Islands	170	(127)		
	Other Islands	86	(55)		
		—		932	(577)
EUROPE	United Kingdom	165	(201)		
	Other Countries	440	(321)		
		—		605	(522)

The increase in the number of identifications sent out was due partly to the fact that, from 1st November, 1937, two additional Entomologists were taken on the permanent staff of the Institute, namely, Dr. F. van Emden, who specializes on the Diptera and the larvae of Coleoptera, and Mr. G. E. J. Nixon, who deals with certain groups of Parasitic Hymenoptera.

From the collections received thousands of named specimens are, of course, returned to the senders; but in addition to this, 16,091 (39,200) insects have been handed over to the British Museum, of which 434 (292) were types of species new to science, and among the remainder were 914 (439) named species not previously represented in the National Collection. Some 10,500 named specimens were also presented to the Royal Veterinary College, London; Aberdeen University; the Institut für Schiffs und Tropenkrankheiten, Hamburg, Germany; and the Department of Agriculture, Bangkok, Siam.

"Review of Applied Entomology."

Dr. Neave reports that the 25th volumes (1937) of the two Series of the *"Review of Applied Entomology"* comprised 1,094 pages (exclusive of indices) and 2,626 abstracts as compared with 1,134 pages and 2,710 abstracts in the volumes for the previous year. The method of saving space by grouping two or more reports into one abstract was continued as far as possible.

In comparison with 1936, when the sales of this journal were the best on record, the numbers of subscribers to Series "A" increased by 15 from 588 to 603 though the number taking Series "B" fell by 5 from 447 to 442. There was also a good demand for back numbers, so that the net cash receipts rose from £1,440 12s. 3d. in 1936 to £1,595 18s. 11d. in 1937.

"Bulletin of Entomological Research."

The 28th volume (1937) of this journal contained 670 pages. It was thus smaller than the volume for 1936 (736 pages), which included the special part on locust problems issued in view of the International Locust Conference in Cairo, but it was larger than any volume issued previously. It was illustrated by 19 plates (1 coloured) and comprised 43 separate papers.

The number of subscribers increased from 375 (in 1936) to 386, and sales of back numbers also increased, but there was a drop in sales of reprints. The total receipts were £812 0s. 9d., as compared with £868 0s. 0d. (in 1936), and the cost of production amounted to £767 7s. 4d. (printing and paper £551 14s. 5d., illustrations and maps £156 11s. 9d., postages and binding £59 1s. 2d.), leaving a net profit of £44 13s. 5d.

"Zoological Record" Part "Insecta."

Volume 73 (literature of 1936) was larger than the preceding one containing 3,725 titles as against 3,424. The number of subscribers in 1937 was 134 (as against 120 in 1936) and the sales produced a profit to the Institute of £80 11s. 2d. (as against £52 16s. 6d.), after deduction of amounts due to the Zoological Society of London. The marked increase in profits from

sales is chiefly accounted for by a demand for back volumes. To this has to be added the annual contribution of £100 made to the Institute out of the "Zoological Record" Fund towards the cost of production.

Other Publications

During 1937, 66 copies of Mr. T. H. C. Taylor's book "The Biological Control of an Insect in Fiji" were sold; this work was published by the Institute in February, 1937.

The Zoological Society of London made a further contribution of £50 0s. 0d. to the funds of the Institute towards the cost of supervising the preparation of the "Nomenclator Zoologicus." Work on this has made considerable progress, and a first batch of manuscript is now in the hands of the printers.

General Information Service

The following are some of the enquiries that have been dealt with during the year :—

Canada.—A European weevil, *Sitona lineatus*, having recently appeared in Canada, information was supplied to the Dominion Entomologist regarding its life-history, distribution, and status as a pest in Europe.

Australia.—Difficulties having arisen in connection with the importation of Australian fruit into Egypt, information was sent to Australia House as to the occurrence of various scale-insects in Egypt, and also regarding the distribution of Codling Moth and Peach-tip Moth in the Mediterranean area.

The Commonwealth Division of Economic Entomology having complained that all insects transmitted by air from Europe to Australia arrived dead (probably owing to heat), the matter was taken up with the Imperial Airways, with the result that experiments have been started to secure cooler conditions for the packages. The Division was also supplied with a translation of an important Russian paper on grasshoppers.

A report was sent to the Government Entomologist, New South Wales, on methods purporting to control grasshoppers by means of bacteria or fungi.

Union of South Africa.—The Director of Veterinary Services sought information on possible methods of controlling the spread of *Lyperosia*, and recommendations were made.

Southern Rhodesia.—An enquiry was dealt with regarding the regulations for controlling the importation of citrus fruit into the Channel Islands. Methods were also recommended for the fumigation of official records against the attacks of insect pests.

India.—Information was supplied regarding the distribution and parasitism of the Lantana Fly in India; and suggestions were offered concerning the control of insects damaging cardamoms and of the cotton-stem weevil in South India.

Kenya Colony.—A report was supplied to the Director of Agriculture on the general position and results of research work on locusts as affecting East Africa.

The Coffee Board of Kenya were sent a report on the occurrence of *Tribolium* in a consignment of coffee.

Nigeria.—The Government Entomologist made enquiry regarding earlier records of Pink Bollworm of cotton in Nigeria, and was informed that these were almost certainly erroneous.

Palestine.—Information was supplied as to the probable origin of attack by Longicorn beetles on woodwork in the Archaeological Museum, with recommendations for treatment, and translations were supplied of two Russian papers on the subject.

A statement was supplied on the distribution and host-plants of a Jassid suspected of transmitting virus disease in egg-plants; and also regarding the occurrence of various species of *Ephestia* moths in fresh fruit.

Mauritius.—A report was submitted on the proposed introduction of the Giant Toad into Mauritius, which was recommended, and arrangements were made to obtain a consignment of these animals from Porto Rico.

Recommendations were made regarding the introduction of various parasites of sugar-cane pests.

British North Borneo.—Suggestions were made for the control of three different insect pests.

Zanzibar.—Information was supplied concerning various beetles suspected of being injurious to clove trees.

Seychelles.—Reports were supplied to the Colonial Office on work being done in connection with the introduction of predators to control scale-insects on coconuts.

British Somaliland.—Information was sent to the Veterinary and Agricultural Officer on the following subjects: Tabanid flies and trypanosomiasis; a disease of sorghum; control of field-crickets; and practical measures for use against locusts.

Colonial Office.—Reports were furnished on the following subjects: on the effects of cold storage in destroying *Ceratitis* in fruit during transit; on the present known distribution of *Ceratitis capitata* in all countries; on the advisability of allowing South African citrus fruits to be introduced into the West Indies; on proposed legislation to prevent the Cotton Boll Weevil from spreading into the British West Indies; and on a supposed new method of controlling this weevil in Florida and Georgia.

The Director continued to serve on the Colonial Advisory Council of Agriculture and Animal Health, and on the Committee on Locust Control and the Tsetse-Fly Committee of the Economic Advisory Council. He also served on the Lawes Agricultural Trust Committee, and on the Advisory Committee on Forest Research of the Forestry Commission, and was a member of the Consultative Committee on Insecticide Materials of Vegetable Origin of the Imperial Institute.

Visitors

The following economic entomologists came to the Institute during the year and discussed various problems in which they were interested:—Dr. G. A. Currie (weed control) from Australia; P. M. Glover from India; E. Ballard from Palestine; H. W. Bedford, F. G. S. Whitfield from the Anglo-Egyptian Sudan; C. F. M. Swynnerton, B. D. Burt, W. H. Potts, of the Tsetse Research Department, Tanganyika; G. E. Bodkin, W. F. Jepson from Mauritius; H. Hargreaves, T. H. C. Taylor from Uganda; E. Hargreaves from Sierra Leone; C. B. Symes from Kenya; Dr. W. A. Lamborn from Nyasaland; F. B. Notley from Tanganyika; G. D. Austin from Ceylon; N. C. E. Miller from the Federated Malay States; and H. M. Morris from Cyprus.

Locust Investigations

The sixth survey of the locust situation in Africa and Western Asia during 1936 was published, and a similar survey for the year 1937 has been prepared for the press. These two surveys include as appendices lists of papers on locusts and grasshoppers, which have appeared throughout the world during the respective years.

In addition to the surveys of the current developments in the locust situation, a study was made of old records of the previous outbreaks of the Desert Locust, *Schistocerca gregaria*, Forskal. The records, when mapped and analysed in detail proved to be of great value in suggesting regularities in the swarming and migrations of this species. A general summary of this work is being prepared for publication.

Owing to the generosity of the Carnegie Corporation, who agreed to finance the meteorological investigations in connection with locust research, it was possible to arrange for the preparation by the Meteorological Office (Air Ministry) of a series of maps of the continent of Africa and of Arabia showing the main weather data for each month and for the whole period of the present locust outbreak. These maps will serve for a direct comparison with the maps showing the movements of locusts for each month of this period in order to establish correlations between weather factors and the breeding and migrations of locusts.

At the request of the Fourth International Locust Conference, the Institute, as the International Centre for Anti-Locust Research, has collected statistical data on the losses caused by locusts and grasshoppers throughout the world, and on the expenditure for their control, during the ten year period 1925-1934. A summary of the data was presented to the Fifth International Locust Conference, held at Brussels in August, 1938.

The investigations of the Locust Laboratory under Dr. A. G. Hamilton on the effect of fluctuating temperatures and humidities on the development and life-cycle of the three species of locusts, are approaching completion. Work on the physiological action of external poisons on locusts is still in progress.

Field investigations in Africa were continued only in Tanganyika Territory by Mr. A. R. G. Michelmores, who was studying the ecology of the Red Locust (*Nomadacris septemfasciata*, Serville) in its outbreak area at Lake Rukwa, where a temporary field station was established. These investigations have now been finished, and a final report on the Red Locust is in the course of preparation.

Excellent progress has been made in preparing the ground for the establishment of a permanent international organization for the prevention of locust outbreaks in Africa. Detailed schemes of these organizations were discussed at the Fifth International Locust Conference at Brussels.

Library

Accessions during the year numbered 371 volumes and 1,320 pamphlets, and the library now contains 9,640 bound volumes and 25,197 pamphlets. Parts of 585 serial publications were received during the year.

In addition to the daily internal use of the library by visitors, books and pamphlets issued on loan totalled 843 (as against 613 in the preceding year); in addition 64 (14) items were lent to Farnham House Laboratory. Government departments and other institutions borrowing books included:—The Ministry of Health; the Department of Scientific and Industrial Research; the British Museum (Natural History); the Imperial Mycological Institute; the Imperial Bureaux of—Animal Genetics, Animal Health, Agricultural Parasitology, and Herbage Plants; the London School of Hygiene and Tropical Medicine; the Liverpool School of Tropical Medicine; Rothamsted Experimental Station, the Royal Entomological Society of London; the Royal College of Veterinary Surgeons; Cambridge Philosophical Library; and Imperial Chemical Industries. Books were also sent on loan overseas to Canada, Kenya, British Honduras, Germany and Poland.

The catalogue of serial and official publications was maintained up to date (in quadruplicate) and at present comprises some 3,650 slips, many of which contain more than one entry. The author-catalogue is maintained up to date for books and pamphlets. During the year the entomological contents of 243 volumes were catalogued. The arrears amount to 2,292 volumes of serial publications, approximately 25 per cent. of the library, a proportion of which has already been catalogued from reprints of the papers.

SCIENTIFIC PAPERS PUBLISHED DURING THE YEAR BY MEMBERS OF THE STAFF OF THE INSTITUTE

- BRYANT, G. E.—Notes on synonymy in the Phytophaga (Coleoptera).—Ann. Mag. nat. Hist., 5 pp.
Two new injurious Phytophaga from East Africa (Coleopt.).—Proc. R. ent. Soc., 2 pp.
New species of Chrysomelidae (Coleopt.) from the Solomon Islands collected by R. A. Lever.—Proc. Roy. Ent. Soc., 4 pp.
- EMDEN, F. VAN.—Neue und bekannte Carabidae aus Java (Coleoptera).—Arb. morph. taxon. Ent., 24 pp.
On the larval characters of *Anthia* (Coleoptera, Carabidae).—Ent. mon. Mag., 4 pp.
Einige Carabidae von den Salamo und Sta. Cruz. Inseln, den Neuen Hebriden sowie Neu-Guinea.—Stettin ent. Ztg., 2 pp.

- FERRIERE, C.—Notes on two new Oriental parasites of the coffee mealy-bug (*Pseudococcus lilacinus*).—Bull. Ent. Res., 6 pp.
- KENNEDY, J. S.—The humidity reactions of the African migratory locust, *Locusta migratoria migratorioides*, R. & F., gregarious phase.—J. exp. Biol., 3 pp.
Phase transformation in locusts in the field.—Nature, London, 2 pp.
- MARSHALL, Sir G. A. K.—New Curculionidae (Col.) from Mauritius.—Ann. Mag. nat. Hist., 10 pp.
New injurious Curculionidae (Col.).—Bull. Ent. Res., 11 pp.
On some Oriental Cossoninae (Col. Curc.).—Proc. R. Ent. Soc., 5 pp.
On Curculionidae from the New Hebrides.—Rev. franc. Ent., 5 pp.
New Curculionidae (Col.) from New Zealand.—Trans. R. Soc. N. Zealand, 27 pp.
- MAXWELL-DARLING, R. C.—The Desert Locust.—Sudan Notes and Records, Khartoum, 7 pp.
The outbreak areas of the Desert Locust (*Schistocerca gregaria*, Forsk.) in Arabia.—Bull. Ent. Res., 14 pp.
- MORRIS, K. R. S.—The prepupal stage in Ichneumonidae, illustrated by the life-history of *Exenterus abruptorius*, Thb.—Bull. Ent. Res., 10 pp.
- MORRIS, K. R. S., CAMERON, E., and JEPSON, W. F.—The insect parasites of the spruce sawfly (*Diprion polytomum*, Htg.) in Europe.—Bull. Ent. Res., 53 pp.
- NIXON, G. E. J.—A new genus belonging to the subfamily Platygasterinae (Hym., Proctotrupoidea).—Ann. Mag. nat. Hist., 5 pp.
Two new African species of *Telenomus* (Hym., Proctotrupoidea).—Ann. Mag. nat. Hist., 6 pp.
New Asiatic Telenominae (Hym., Proctotrupoidea).—Ann. Mag. nat. Hist., 15 pp.
Some Asiatic Telenominae (Hym., Proctotrupoidea).—Ann. Mag. nat. Hist., 32 pp.
The British species of *Dacnusa* (Hym. fam. Braconidae).—Trans. Soc. Br. Ent., 88 pp.
- SCHENKLING, S., and MARSHALL, G. A. K.—Curculionidae: Rhadinosominae, Trachodinae, Raymondionyminae.—Coleopt. Catalogus, 's-Gravenhage, 2, 3 and 5 pp.
- UVAROV, B. P.—Locusts as an international problem.—Current Science, Bangalore, 3 pp.
Die Arthropodenfauna von Madeira. I. Orthoptera.—Arkiv. f. Zool., 6 pp.
A representative of an Old World subfamily of Acrididae in south-western North America.—Pan-Pacific Entom., 4 pp.
Two South American Acridid genera with Old World affinities.—Rev. Soc. ent. Argentina, 3 pp.
Grasshoppers collected by Captain F. Kingdon Ward in Tibet in 1935.—Linn. Soc. Journ., Zool., 4 pp.
Orthoptera collected by the Polish Alpine Expedition to the Caucasus in 1935.—Fragm. Faun. Mus. Zool. Polon., 4 pp.
A list of Orthoptera from South Arabia.—Bull. Soc. Roy. ent. Egypte, 13 pp.
Studies in the Iranian Orthoptera. iii.—Ann. Mag. nat. Hist., 11 pp.
Moroccan species of the genus *Stenobothrus* (Orthoptera, Acrididae).—Ann. Mag. nat. Hist., 4 pp.
Tropical species of *Tropidopola*, St., and the past history of the genus (Orthoptera, Acrididae).—Ann. Mag. nat. Hist., 4 pp.
Some Acrididae from the Solomon Islands (Orthoptera).—Trecubia, Buitenzorg, 6 pp.
- UVAROV, B. P., and MILNTHORPE, W.—The locust outbreak in Africa and Western Asia in 1936.—Econ. Adv. Coun., Comm. Locust Control, 56 pp.
- WILKINSON, D. S.—A new species of *Apanteles* (Hym., Brac.) bred from *Myelois ceratoniae* attacking carobs in Cyprus.—Bull. Ent. Res., 4 pp.
On two new Palaearctic species of *Apanteles* (Hym., Brac.).—Proc. R. Ent. Soc., 8 pp.

APPENDIX II

IMPERIAL MYCOLOGICAL INSTITUTE
REPORT FOR 1937-38

The work of the Institute has been continued during the year on the same lines as in preceding years, namely (i) investigation, (ii) identification, and (iii) the collection and dissemination of information.

Investigational Work

As hitherto, investigation has been concerned mainly with the study of critical genera and species of fungi received for identification and more or less of phytopathological importance. Dr. Wiltshire, in spite of the heavy calls upon his time as editor of the *Review*, has been able to continue his studies on *Alternaria* and related genera. He has made much progress in differentiating the species of that genus occurring on the species and varieties of *Citrus*, especially with the aid of further good collections from Southern Rhodesia. A list of the species of *Alternaria* published hitherto has been compiled for reference. He has completed the difficult study of the species of the genus on the *Brassicac* and a paper on them is nearly ready for the press. His fundamental paper "The original and modern conceptions of *Stemphylium*," accepted for publication in 1936, was excessively delayed and did not appear during the year (it was published in the *Transactions of the British Mycological Society*, Vol. 21, in June, 1938).

Mr. Mason, while having to give much of his time to identifications, was able to complete the general part of the third fascicle of List II of the "Annotated Account of Fungi received at the Imperial Mycological Institute," and this part was issued in September. In it he has attempted to establish a more correct method of classifying and naming Fungi Imperfecti which is, moreover, better suited to the needs of applied mycology. Considerable progress was made in the preparation of the special part of the third fascicle.

Mr. Dade, who gave most of his time to the *Review*, of which he is sub-editor, was able to continue his studies on the genus *Aspergillus* and on heterothallism in *Ceratostomella* (*Ophiostoma*) *paradoxa*. New isolations of this species, notably from sugar-cane in India and from banana, sugar-cane and pineapple in Queensland, when paired with the "tester" strains from the Gold Coast yielded perithecia with one or the other of the latter behaving normally as representing one "sex" only of the species. Experiments on the nature of "sexuality" in this species have not, up to the present, indicated that production of the perfect stage is due to a chemical stimulus alone. Mr. Dade's paper, "New Gold Coast Fungi, I," was published in the *Transactions of the British Mycological Society* (Vol. 21, October, 1937). Five species of fungi new to science were described in it.

At the request of the Secretary of State for the Colonies on behalf of the local Government, Mr. Dade went to the Gold Coast in May, returning in July, to investigate a swollen-shoot and dieback disease of cacao. His comprehensive report was published by the Government of the Gold Coast in December as Council Paper No. V of 1937, under the title "Swollen Shoot of Cacao: Report on Mr. H. A. Dade's visit to the Gold Coast."

Dr. Bisby gave his time mainly to identifications, the number of which exceeded those in any preceding year, being especially heavy from Canada, and East and West Africa. His special knowledge of soil fungi and the rusts (Uredineae) enabled large sendings to be dealt with effectively and promptly. He has been able to see through the press the "Fungi of Manitoba and Saskatchewan," a very comprehensive annotated list to which he has been the main contributor. It is being published as a special bulletin by the National Research Council of Canada.

Mr. W. F. Steven assisted as a voluntary worker, giving his attention especially to the *Cercosporae*.

Identification Work

Specimens and cultures of fungi, many of them phytopathogenic, have been received for identification from all contributing Empire countries. Notably large numbers have come from Canada, East and West Africa and Cyprus but many also from Australia, India, New Zealand, South Africa, Southern Rhodesia and the West Indies. Among the more interesting identifications were *Phytophthora megasperma* from sugar beet in England, *Ph. palmivora* from citrus in Brazil, *Ph. cactorum* from pear and apricot fruits in India, from hop in New Zealand and from *Erica* sp. in England, *Ph. cryptogea* from petunia in England and *Ph. parasitica* from delphinium in South Africa. *Pythium torulosum* was identified from wheat roots in England, *P. proliferum* from cotton roots in the Sudan, *P. splendens* from betal-vine in Malaya, *P. complectens* from ginger in Ceylon and durian in Malaya, and *P. ultimum* and *P. intermedium* from sugar beet in England. Among other interesting fungi were *Aspergillus ruber* from mango in India, *Helicobasidium compactum* from *Pinus* spp. in South Africa, *Exobasidium hesperidium* from *Rhus* sp. in Uganda, *Physalospora fusca* from *Tephrosia candida* in Uganda, *Mycosphaerella carinthiaca* from red clover in Canada (a first record for North America), *Helminthosporium cassiaeicola* from various hosts in West Africa, *Gloeosporium album* from apple fruits in Canada, *Sordaria setosa* from fruits of orange in South Africa and *Pseudoeurotium zonatum* from wheat roots in England and forest soil in New Zealand.

A new and injurious rust on species of *Crotalaria* in Malaya, where they are important cover crops, was submitted to Mr. H. Sydow, who has described it as the new species *Maravalia crotalariae* (*Ann. mycol., Berl.*, 35, p. 244, 1937).

Mr. R. H. Bunting, as in the preceding year, has kindly identified a number of pencillate fungi and Mr. T. Petch a number of entomogenous fungi. The Institute is also indebted to Dr. H. W. Wollenweber in Berlin and Dr. H. W. Gordon in Winnipeg for identifications of species of *Fusarium* and to Mr. H. Sydow in Berlin for identifications of various fungi.

The identifications of fungi made at the Institute during this and preceding years have enabled mycologists in a number of the Colonies and Dependencies to complete and send to press lists of diseases of their economic plants. A comprehensive "Annotated host list of Uganda parasitic fungi and plant diseases" was published in five parts in the *East African Agricultural Journal* from March, 1937, to January, 1938, and is now available as a reprint under one cover. "A revised list of plant diseases in Tanganyika Territory" was published in the same journal (January, 1937). "A first list of Cyprus fungi" with annotations and host index was issued in December, 1937, as a publication of the Department of Agriculture. "A preliminary list of plant diseases in Nigeria" was published in the *Kew Bulletin of Miscellaneous Information*, No. 1, 1938.

Information Service

Volume XVI of the *Review of Applied Mycology* was issued and the index to volume XV was published in July. The subscription rate for the *Review* was raised from £1 1s. to £1 10s. in January, 1938. An intimation of this increase appeared on the front of the cover each month from May, 1937, so that subscribers might have ample notice. At the request of the Executive Council all Empire subscribers to volume XVII (1938) have been allowed a rebate of 20 per cent. The percentage rebate (16½) to booksellers has remained the same as in preceding years. The cost of printing and distributing the *Review* during the financial year was £950 and the receipts from sales of publications amounted to £960. The revised estimates for printing and distribution were £955 and for receipts £880. This is the first year that receipts from sales have equalled the costs of printing and distribution. Hitherto there had been an annual loss exceeding £200. A falling off in subscriptions to 31st March, 1938, due to the raising of the rate has not been perceptible. The distribution of the *Review* in March, 1938, was 974 as against 950 in March, 1937. Volume XVI (1937) contained 978 pages including the index of 130 pages, the number of papers abstracted being 1,951, the highest total hitherto. This figure is conservative as a number of reports, each containing many individual papers, have been abstracted as single entities to save the space taken by titles without, however, cutting down the abstracts of the individual papers.

The total number of letters sent away was 1,915 (excluding those concerned with the distribution of the *Review*) of which 700 were replies to specific enquiries for information; the corresponding figures for 1936-37 were 1,630 and 500 respectively. The number of books and reprints loaned was 155.

The "Annotated Account of Fungi received at the Imperial Mycological Institute, List II, Fascicle 3, General Part" was issued in September and "Mycologists resident in the British Empire, 1938" was issued in January. This list was a revision to the end of 1937 of that issued in 1932. Free copies were distributed with each free number of the *Review* for January going to contributing Empire countries. These and earlier special publications were advertized in the *Review*.

Staff Changes

The Clerical Staff was increased by the appointment of Miss H. O. McFarlane, M.A., as Junior Clerk effective from 1st April.

Miss M. de Regal was employed temporarily as Abstractor from the 10th January to 16th February and Miss V. Broido as Abstractor from the 21st February to 21st March.

Mr. W. F. Steven, M.A., A.I.C.T.A. was appointed as Assistant Mycologist on a temporary basis from the 7th March.

Miscellaneous

Internal and external redecoration of the building of the Institute was carried out under the superintendence of H.M. Commissioners of Works during July and August at a cost of £132. This work was in accordance with the terms of the lease which called for redecoration after seven years.

The inspection of banana plants passing through quarantine in the special glasshouses at the Royal Botanic Gardens, Kew, for the collection of varieties at the Imperial College of Tropical Agriculture in Trinidad has been continued. Consignments of cacao pods from Trinidad and Nigeria and the seedlings raised from the beans at the Gardens have been inspected also on a number of occasions.

Pods carefully picked and surface sterilized and transported at a temperature above 60° F. (preferably 60° to 70°) have been received after two weeks in good condition; the beans germinated well and produced strong healthy plants.

APPENDIX III

FARNHAM HOUSE LABORATORY
REPORT FOR 1937-38

One hundred consignments of beneficial insects, comprising a total of 4,557,046 specimens, were sent out from Farnham House Laboratory to Empire states, as shown in the following Table :—

	<i>Country</i>						<i>Shipments</i>	<i>Specimens</i>
Great Britain	15	25,700
Canada	47	4,484,176
Australia	17	17,630
New Zealand	15	24,984
India	4	4,000
Mauritius	2	556
							<hr/> 100 <hr/>	<hr/> 4,557,046 <hr/>

The falling off in the number of consignments and specimens despatched is due to the cessation of certain types of work in which large masses of material were available for collection : notably, the work on one of the Pine Sawflies and the Ragwort Seed-fly, which involved, in 1936-37, the collection of about 21,550,000 specimens out of the total of 22,338,360 obtained in that year.

The amount of work actually dealt with by the Laboratory increased somewhat as compared with the previous year, as is shown by the receipts of funds for special projects which totalled about £600 more than in 1936-37. Under this head, Canada provided a total of £3,358 14s. 1d. which included a payment of £242 17s. 7d. outstanding from the previous year; the Forestry Commission of the United Kingdom provided the sum of £783 4s. 4d., which includes a credit of £18 18s. 3d. carried forward to 1938-39. New Zealand provided the sum of £629 3s. 1d., which included an advance of funds of £100 from the Cawthron Institute for weed research work, and the payment of the outstanding balance of £158 3s. 7d. carried over from the previous year and authorized in it. Mauritius provided a total of £140 8s. 4d., leaving a balance due for expenditure incurred by 31st March, 1938, of £61 8s. 3d. South Africa provided £37 15s. 2d., the Ministry of Agriculture and Fisheries the sum of £14 6s. 7d. and Fiji the sum of £6 0s. 0d.

The main projects undertaken by the Laboratory during the financial year 1936-37 were as follows :—

INSECTS AFFECTING CEREAL AND FORAGE CROPS

WESTERN WHEAT-STEM SAWFLY (*Cephus cinctus*, Norton).

The preliminary survey for suitable collecting grounds for the parasites of the Wheat-stem Sawfly was carried out, as in the previous year, by Mr. D. Berryman. The material secured was sorted out at the Laboratory during the autumn and winter. A total of 15 shipments of cocoons of *Cephus pygmaeus*, heavily parasitized by the Ichneumonid *Collyria calcitrator* and 3,261 cocoons containing the Chalcid, *Pleurotropis benefica*, were despatched to Canada.

Data on the distribution of the progeny of the parasite *Collyria calcitrator* in the population of *Cephus* larvae, collected at the Laboratory in the initial stages of the *Cephus* work, were made the subject of a bio-mathematical study by Dr. M. G. Walker, and published in "*Parasitology*," Vol. 29, pt. 4, pp. 477-503.

INSECTS AFFECTING DECIDUOUS FRUITS

FALSE CODLING MOTH (*Argyroplote leucotrela*, Meyr.).

This insect is, in South Africa, a serious pest of citrus fruits. It does not occur in Europe, but a number of closely allied species exist, of which several are known in Great Britain. It is possible that some of these might prove useful against the South African species. Mr. E. Cameron therefore carried out, at the request of Dr. Naudé and Dr. Ulyett, a preliminary survey and investigation of the moths of the genus *Argyroplote* and their parasites. Funds for an extensive survey were not obtainable, but a number of species of *Argyroplote* were discovered in the South of England and some information concerning their parasites was secured and has been embodied by Mr. Cameron in a report sent by the Laboratory to the South African entomologists.

WOOLLY APHIS OF THE APPLE (*Eriosoma lanigerum*, Hausm.).

Eleven consignments containing approximately 22,200 specimens of the parasite, *Aphelinus mali*, were sent to correspondents in Great Britain. Four consignments, containing 4,000 specimens of *Aphelinus* were despatched to India. Some fruit-growers from Essex visited the Laboratory to secure information regarding the rearing of the parasite in the insectary. The methods used were explained to them and it is understood that they have now set up their own breeding cages for the purpose. The results of this experiment will be of considerable interest.

INSECTS AFFECTING FOREST AND SHADE TREES

THE WHITE SPRUCE SAWFLY (*Diprion polytomum*, Htg.).

The White Spruce Sawfly has continued to increase and spread in Canada, doing great damage to White, Red and Black Spruce. There is no indication that its capacity for destruction is diminishing under Canadian conditions. The Canadian authorities have, therefore, requested the Laboratory to continue the collection and study of the parasites of the Spruce Sawfly and its allies. In the financial year 1936-37 this work was placed in the charge of Mr. J. Eliot Moss, who made extensive surveys for material in Czechoslovakia, Germany and Poland. Seventeen consignments of material containing 4,220,144 specimens, were collected and despatched to Canada. These comprised six lots of *Diprion polytomum*, with 161,685 specimens, three consignments of the Pine Sawfly *Diprion similis*, with 4,051,400 specimens, two consignments of the puparia of a Tachinid parasite, with 1,298 specimens, and six consignments of Sawflies of the genus *Nematus*, with 5,761 specimens.

It is of interest to note that since the beginning of the Spruce Sawfly work up to December, 1937, 66,906,600 individuals of parasites of the Spruce Sawfly, or allied forms, representing about 24 species, have been liberated in the infested area in Canada. By far the greater part of this material was provided by Farnham House Laboratory or reared from stocks originally supplied by it.

Three technical papers on the parasites of the Spruce and Pine Sawflies were published during the year. These were:—"The Insect Parasites of the Spruce Sawfly (*Diprion polytomum*, Htg.) in Europe," by K. R. S. Morris, W. F. Jepson and E. Cameron, in the "*Bulletin of Entomological Research*," xxviii, pt. 3, pp. 341-393; "The Prepupal Stage in Ichneumonidae, illustrated by the life-history of *Exenterus abruptorius*, Thb.," by K. R. S. Morris, in the "*Bulletin of Entomological Research*," xxviii, pt. 4, pp. 525-534; "*Eupelmella vesicularis*, Retz. (Chalcididae) as a predator of another Chalcid, *Microplectron fuscipennis*, Zett.," by K. R. S. Morris, in "*Parasitology*," xxx, 1, pp. 20-32.

HOLLY LEAF MINER (*Phytomyza ilicis*, Curt.).

Six consignments containing 85,000 specimens of this insect, of which a considerable proportion was parasitized by several species of Chalcids, were despatched to Canada by Mr. E. Cameron. From them were obtained 10,331 specimens of *Chrysocharis gemma*, 1,036 specimens of *Chrysocharis syma*, 148 specimens of *Cyrtogaster vulgaris* and 1,306 specimens of *Sphegigaster*

flavicornis. All of these were liberated in the areas infested by the Holly Leaf Miner in the Province of British Columbia.

An extensive detailed survey of the Holly Leaf Miner in southern England has been begun by Mr. Cameron in the hope that the study of this insect, which is particularly suitable for quantitative field studies, will throw light on the general problem of the biological control of insect pests under natural conditions.

BALSAM BARK LOUSE (*Dreyfusia piccae*, Ratz.).

Since the Agromyzid predator, *Leucopis obscura* has been successfully established in the Maritime Provinces, with stocks previously shipped by Farnham House Laboratory, attention was devoted this season to other useful predators. Three consignments of *Exochomus quadripustulatus*, containing 15,000 specimens of this ladybird and one consignment of the Neuropterous predator, *Hemerobius stigma*, comprising 923 specimens in the egg stage, were despatched to Canada by Mr. Cameron; 7,864 specimens of *Exochomus* and 423 specimens of *Hemerobius* survived the journey and were liberated in the field.

LARCH CASE BEARER (*Coleophora laricella*, Hb.).

Three consignments of Larch Case Bearer material, containing 80,000 specimens of the insect in the larval and pupal stage, were collected by Mr. E. Cameron and despatched to Canada. Parasitism was unfortunately low; but 35 specimens of *Angitia nana*, 916 specimens of *Diadromus westwoodi* and 246 specimens of *Microdus pumilus* were reared and liberated in Canada.

PINE BARK BEETLE (*Myclophilus piniperda*, L.).

Mr. H. S. Hanson has continued his studies on the natural control of this important pest in co-operation with the officers of H.M. Forestry Commission. Experiments designed to test the methods of control based on his investigations, have been laid down in all the principal pine-growing areas of England, Scotland and Wales. A preliminary paper: "Notes on the Ecology and Control of Pine Beetles in Great Britain" was published by Mr. Hanson in the "Bulletin of Entomological Research," xxviii, pt. 2, pp. 185-236.

INSECTS AFFECTING GARDEN CROPS.

THE DIAMOND-BACK MOTH (*Plutella maculipennis*, Curt.).

Facts in regard to the distribution of the parasites of other insect pests, noted by the Superintendent during a short visit to Holland, suggested that it might be profitable to extend the survey for Diamond-Back Moth parasites to that country. Mr. D. C. Lloyd therefore proceeded to Holland in July. The Dutch entomologists gave him all possible assistance and with their help he discovered a number of important areas for study and there found certain parasites which hitherto it had not been possible to obtain in numbers sufficient for export. As a result of this work, 15 consignments containing 24,984 specimens of pupae parasitized by *Diadromus collaris* and cocoons of *Apanteles plutellae*, were despatched to New Zealand by Mr. Lloyd.

A paper on the ecology and natural control of *Plutella maculipennis*, based on the results of an extensive series of experiments in the Laboratory, was prepared by Mr. J. Eliot Moss.

PEA MOTH (*Cydia nigricana*, Steph.).

Mr. E. Cameron has continued the Laboratory and field studies of this important pest and has prepared a paper for publication, giving the results of his investigations.

The collection of Pea Moth material is expensive and laborious, and the rearing of the insect, which hibernates in the soil, is unusually difficult. However, Mr. Cameron succeeded in obtaining 30,000 cocoons which were despatched to Canada and will, it is hoped, under the conditions provided at the new Parasite Laboratory erected by the Canadian Government at Belleville, provide a good colony of parasites for liberation in infested areas.

MISCELLANEOUS INSECTS.

WHITE GRUBS (*Lachnosterna*, *Melolontha*, etc.).

A shipment of 443 larvae of *Melolontha melolontha*, artificially parasitized in the laboratory by the larvae of *Dexia rustica*, was prepared by Dr. M. G. Walker and despatched to Mauritius, where the parasite will be reared and liberated against the White Grub of Sugar Cane (*Lachnosterna smithi*, Arrow.).

A consignment of 113 specimens of the Giant Toad (*Bufo marinus*) collected for the Mauritius Government in Porto Rico, with the help of the representative of the United States Bureau of Entomology, who was kindly allowed by the United States authorities to organize the collection, was repacked at Farnham Royal and sent on to Mauritius, where the toads are to be released against the Sugar-cane White Grubs.

MEALY BUGS (*Pseudococcus* spp.).

A consignment of *Leptomastix dactylopii*, a South American parasite of Mealy Bugs introduced into the United States by the Parasite Laboratory of Riverside, California, and sent from there to the Canadian Parasite Laboratory at Belleville, was received from Belleville, and is being bred at Farnham Royal, in the hope that it will be of use in the control of the Coffee Mealy Bug of Kenya or of certain Mealy Bugs troublesome in English greenhouses.

THISTLE INSECTS.

At the request of Dr. David Miller of the Cawthron Institute, New Zealand, an investigation into the insects attacking certain thistles has been undertaken. The species most troublesome in New Zealand is the Variegated Thistle (*Carduus marianus*, L.) which is not a native of Great Britain. Attention has therefore been directed to the insects attacking its nearest ally, the Spear Thistle (*Carduus lanceolatus*, L.) some of whose insect enemies are known to attack the Variegated Thistle. This investigation, carried out by Mr. R. J. Spittle, has already provided a good deal of useful information concerning the part played by insects in the natural control of thistles.

AUSTRALIAN WORK.

Mr. Stanley Garthside, of the Division of Entomology of the Commonwealth Council for Scientific and Industrial Research, has continued his investigations of Australian plant and insect pests, assisted until March by Mr. H. T. Galsworthy, who then resigned to take up a position in H.M. Post Office. Mr. F. Wilson, who formerly assisted Mr. Garthside at Farnham Royal and is now in charge of a Laboratory at Lavandou, near Hyeres, on the French Riviera, is continuing his studies of Australian pests and their natural enemies in that area. Seventeen shipments of beneficial insects, attacking various weed and plant pests, and comprising 17,630 specimens of 8 species were despatched to Australia during the course of the year.

RESEARCH WORK.

Dr. Oswald Peck, who completed his studies of Ichneumonid morphology in November, 1936, and returned to Canada to take up an appointment in the systematic section of the Entomological Branch of the Canadian Department of Agriculture, published a paper entitled "The Male Genitalia in the Hymenoptera (Insecta), Especially the Family Ichneumonidae," embodying the results of his work in the "*Canadian Journal of Research*," D. 15, pp. 221-274.

Dr. M. G. Walker completed her work under the Carnegie Studentship in September, 1937, and was appointed to a Carnegie Fellowship for the year ending October 1st, 1938. During

the financial year she carried on the investigations of the biology of the White Grub, *Melolontha melolontha*, L. and its parasite, *Dexia rustica*, L. The morphological studies of the latter parasite were carried out by the Superintendent.

Mr. D. C. Lloyd continued his studies of the host relation problem in the egg parasite, *Ooencyrtus kuvanae*, How., until 10th July, 1937, when he was appointed to the staff of the Laboratory and took over the Diamond-Back Moth investigations.

Dr. S. G. Smith, appointed by the Royal Society of Canada to a Studentship for cytological investigations of the Spruce Sawfly, arrived in England on 27th October, and was given accommodation in the Zoological Laboratory of University College, London, where he has carried out the major part of his studies; but he has visited Farnham House Laboratory from time to time to consult with the Superintendent and the staff in regard to various aspects of the Spruce Sawfly problem. Dr. Smith published a preliminary note in "*Nature*," vol. 141, p. 121, on the "Cytology of Spruce Sawfly and its Control in Eastern Canada," giving an outline of his results.

The Superintendent, in addition to his studies on the morphology of *Dexia rustica*, the White Grub Parasite, has devoted some time to a general study of the host relation problem in parasitic insects and has continued an investigation of the Pipunculid and Dryinid parasites of Leaf-hoppers, initiated a number of years ago.

VISITORS.

During the course of the year a number of scientific workers visited the Laboratory to inspect its work and discuss their problems. Sir Almroth Wright of St. Mary's Hospital, Dr. and Mrs. L. Colebrooke of Queen Charlotte's Hospital, Mr. S. Hartley and Mr. L. Morris of Eton College, Miss R. Minkle of Sussex, Mr. Aitkins of the University of Aberdeen, Mr. Noel Deerr of Oxford, Dr. H. C. James of Cambridge University, Mr. W. H. Guillebaud of H.M. Forestry Commission, Dr. E. S. Russell of the Ministry of Agriculture and Fisheries, Professor H. G. Jackson of the University of London, Dr. R. N. Chrystal and Mr. J. M. B. Brown of the Forestry Institute, Oxford University, Dr. G. A. Currie of Canberra, Australia, Dr. P. Glasgow of New Zealand, Professor M. A. Husain, Dr. K. N. Trehan and Dr. B. L. Rawat of India, Dr. E. Parry Jones of Southern Rhodesia, who worked at the Laboratory for a week in consultation with the Superintendent on the morphology of Tachinid larvae, Dr. and Mrs. J. D. Tothill and Dr. T. H. C. Taylor of Uganda, Professor F. S. Bodenheimer of Palestine, Mr. G. Douglas Austin of Ceylon, Mr. R. A. Lever of Fiji, Dr. H. L. Parker and Mr. W. F. Sellers of the European Parasite Laboratory of the United States Bureau of Entomology at St. Cloud, France, and Professor Dr. W. Roepke of Holland. Mr. A. B. Baird, Director of the Dominion Parasite Laboratory of the Canadian Entomological Branch, at Belleville, Ontario, arrived in England on 1st June, and spent some days inspecting the work of the Laboratory and discussing common problems with the Superintendent and staff. He then left for a short stay in Southern France, after which he returned to Paris, where he was met by the Superintendent, who accompanied him on a tour of about two weeks' duration through various areas of entomological interest in France, Holland, Germany, Czechoslovakia, Hungary and Austria. On returning to England Mr. Baird visited a number of entomological centres in the company of the Superintendent and also made a short trip to the Forest of Dean. He left for Canada on 8th July, 1937. Many matters of great practical importance for the conduct of the work in which Belleville and Farnham Royal co-operate were dealt with during the course of this visit.

EXHIBITIONS AND LECTURES.

Exhibits illustrating the work of the Laboratory were given at the Conversazioni of the Royal Society on 4th and 6th May, and after the evening lecture at the Royal Institution on 12th November. A lecture on the work was given by the Superintendent at the Institute of Pathology of St. Mary's Hospital in May on the invitation of the Director, Sir Almroth Wright.

STAFF.

Mr. H. S. Hanson was promoted to Assistant Entomologist as from 1st April, 1937, at a salary of ~~£350-£25-£400-£30-£590~~.

Dr. D. C. Lloyd was appointed an Assistant Entomologist as from 10th July, 1937, at a salary of ~~£250-£20-£350-£25-£400-£30-£590~~.

Miss S. Trickey was appointed as Junior Clerk on 1st April, 1937, at a salary of £120 p.a. and following a six months' probationary period was placed on a salary scale of £130-£6 10s. 0d.-£160.

J. Gunn, the Junior Laboratory Steward, ceased employment on 27th November, 1937.

LIBRARY AND EQUIPMENT.

The library now includes 716 bound volumes and 4,241 separates. No special equipment was purchased during the year.

PARASITE CATALOGUE.

Following suggestions made by the delegates to the Imperial Entomological Conference in 1936, it is intended to publish the records contained in the Parasite Catalogue, and with the completion of the records contained in Volume 25, Series A and B of the "*Review of Applied Entomology*" work was commenced on the checking of the Catalogue. This checking will take a considerable time, not only owing to the shortage of staff for this work, but also due to the very large number of records. However, it is hoped that the first volume will be ready for distribution during 1938/39.

APPENDIX IV

PUBLICATIONS

1. ANNUAL REPORTS OF THE EXECUTIVE COUNCIL OF THE IMPERIAL AGRICULTURAL BUREAUX:

						<i>s.</i>	<i>d.</i>
FIRST REPORT:	1929-30	..	..	..	..	1	0
SECOND REPORT:	1930-31	..	..	..	..	1	0
THIRD REPORT:	1931-32	..	..	..	..	1	0
FOURTH REPORT:	1932-33	..	..	..	..	1	0
FIFTH REPORT:	1933-34	..	..	..	..	4	0
SIXTH REPORT:	1934-35	..	..	..	..	4	0
SEVENTH REPORT:	1935-36	..	..	..	..	5	0
EIGHTH REPORT:	1936-37	..	..	..	..	2	6
NINTH REPORT:	1937-38	..	..	..	..	2	6

2. LIST OF AGRICULTURAL RESEARCH WORKERS IN THE BRITISH EMPIRE, 1938 5s. 0d.

Obtainable from the Secretary, Executive Council, Imperial Agricultural Bureaux, 2 Queen Anne's Gate Buildings, London, S.W.1, and from H.M. Stationery Office at the addresses shown on cover.

THE JOURNAL OF DAIRY RESEARCH

Published by the Cambridge University Press on behalf of the Committee of Management. First issued in November, 1929.

						<i>s.</i>	<i>d.</i>
VOLUMES I to IV (each two parts)	..	..	..	..	..	25	0
Single parts	..	..	..	..	..	15	0
VOLUMES V to IX (each three parts)	..	..	..	..	..	25	0
Single parts	..	..	..	..	..	10	0

PUBLICATIONS ISSUED BY THE IMPERIAL INSTITUTE OF ENTOMOLOGY,
41, QUEEN'S GATE, LONDON, S.W.7

Bulletin of Entomological Research.

Published quarterly, and containing original articles on Economic Entomology. Issued post free.

						<i>s.</i>	<i>d.</i>
Annual Subscription (payable in advance)	..	..	..	..	..	30	0
Subscription to current volume received after 30th June	..	..	..	..	..	36	0
Separate parts	..	..	..	..	..	9	0
Back Volumes:— I (1910)-X	..	..	..	..	..	per vol.	20 0
XI (1920)-XXIII (1932)	..	..	..	..	..	per vol.	25 0
XXIV (1933) <i>et seq.</i>	..	..	..	..	..	per vol.	37 6
Bound Volumes (extra to above prices)	..	..	..	..	..	6	0
Binding cases only	..	..	..	..	..	3	6

Reprints of some of the papers published in this Journal are available. Prices on application.

Review of Applied Entomology.

Consisting of abstracts or reviews of all current literature on Economic Entomology throughout the world. Published monthly in two series:—

Series "A" dealing with insect and other Arthropod pests of cultivated plants, forest trees and stored products of animal and vegetable origin.

Series "B" dealing with insects, ticks, etc., conveying disease or otherwise injurious to man and animals. Issued post free.

						Series "A."		Series "B."	
						s.	d.	s.	d.
Annual Subscription (payable in advance)	..	..	..	..	..	30	0	15	0
Subscription to current volume received after 30th June	..	..	..	..	..	36	0	18	0
Separate parts	..	..	..	..	..	3	0	1	6
Annual Subject Index (when sold separately)	..	..	..	..	..	6	0	3	0
Subject Index—Vols. I-III	..	..	..	..	..	5	0	I-X	10 0
Back Volumes—Vol. I (1913)-VII	..	..	..	..	per vol.	15	0		10 0
Vol. VIII (1920)-XXII (1934)	..	..	..	..	per vol.	24	0		12 0
Vol. XXIII (1935) <i>et seq.</i>	..	..	..	..	per vol.	42	0		21 0
Bound Volumes (extra to above prices)	..	..	..	..	..	5	0		5 0
Binding cases only	..	..	..	..	..	3	6		3 6

The index to the current volume is not published until April (Series "B") or August (Series "A") of the following year.

Zoological Record—Part Insecta.

Published annually about July in each year and containing as complete a record as possible of the literature of the previous year, chiefly from the systematic standpoint.

						s.	d.
Annual Subscription (including postage)	..	..	..	..	..	15	6
Back Volumes:— Vols. LII (1915)-LVII (1920)	..	..	..	..	..	12	0
Vols. LVIII (1921) <i>et seq.</i>	..	..	..	..	..	15	0
Postage extra.							

Some of the Sections into which Volumes LXI-LXVII were divided are still available. Prices on application.

An Abstract of the Legislation in Force in the British Empire Dealing with Plant Pests and Diseases up to the Year 1920.

By E. Marguerite Ralfs, B.A. Med. 8vo. 65 pp. Paper Covers. Price, 2s. 6d. 1921.

Tsetse-Flies. Their Characteristics, Distribution and Bionomics, with some account of possible Methods for their Control.

By Major E. E. Austen, D.S.O., and Emile Hegh. Med. 8vo. 188 pp. With 5 plates and 19 figures. Paper Covers. Price, 7s. 6d. Postage 4d. extra. 1922.

The Phases of Locusts in South Africa.

By Prof. J. C. Faure. Roy. 8vo. 132 pp. Paper covers. With 6 coloured, 19 black-and-white plates and 1 map. Price 12s. (Reprinted from the Bulletin of Entomological Research, Vol. XXIII, Pt. 3. September, 1932.)

Locusts and Grasshoppers. A Handbook for their Study and Control.

By B. P. Uvarov. Imp. 8vo. Pp. xiii and 352. With 9 plates and 118 text figures. Bound in Buckram. Price 21s. net. Postage, inland, 7d.; abroad, 1s. 3d. 1928.

The Coconut Moth in Fiji. A History of its Control by means of Parasites.

By J. D. Tothill, D.Sc., T. H. C. Taylor, M.Sc. (Lond.), and R. W. Paine, B.A. Containing a full account of the successful campaign against this important coconut pest. Imp. 8vo. Pp. vi and 269. With 12 coloured and 22 black-and-white plates, 1 map, and 121 text figures. Bound in Buckram. Price, 31s. 6d. net. Postage, inland, 7d.; abroad, 1s. 3d. 1930.

The Biological Control of an Insect in Fiji. An account of the Coconut Leaf-mining Beetle and its Parasite Complex.

By T. H. C. Taylor, M.Sc. (Lond.). Royal 8vo. Pp. x and 239. With 23 plates, 2 maps and 17 text figures. Bound in cloth. Price 12s. Postage, inland, 6d.; abroad, 10d. 1937.

A List of the Entomologists Employed in the British Empire.

Prepared for the Third Imperial Entomological Conference, 1930. Med. 8vo. 16 pp. Paper covers. Price, 2s. 6d. 1930.

A Summary of Data Relating to Economic Entomology in the British Empire.

Prepared for the Third Imperial Entomological Conference, 1930, by S. A. Neave, M.A., D.Sc. Med. 8vo. 24 pp. Paper covers. Price, 2s. 6d. 1930. (At present out of print.)

Report of the Third Imperial Entomological Conference, 17th-27th June, 1930.

Med. 8vo. 59 pp. Paper covers. Price, 2s. 0d. 1930.

Report of the Fourth Imperial Entomological Conference, 19th-27th September, 1935.

Roy. 8vo. 70 pp. Paper covers. Price, 4s. 0d. 1935.

Orders may be sent direct to the Assistant Director, Imperial Institute of Entomology, 41, Queen's Gate, London, S.W.7, or through a bookseller.

PUBLICATIONS OBTAINABLE FROM THE IMPERIAL MYCOLOGICAL INSTITUTE KEW, SURREY

*Journal***Review of Applied Mycology.**

	s.	d.
Annual Subscription, 12 monthly parts, with title-page and index (post free)	*30	0
Single part	3	0
Title-page and index	4	0
Back volumes (with the exception of Vols. I, VII and VIII, which are out of print) can be supplied, postage extra.		

* 24s. to subscribers in the British Commonwealth, who send their subscriptions direct to the Institute.

*Occasional Publications***Annotated Account of Fungi Received at the Imperial Mycological Institute.**

	s.	d.
List I	1	0
List II, Fasc. 1	1	0
List II, Fasc. 2	2	0
List II, Fasc. 3. General Part	1	0
Report on the Third Imperial Mycological Conference, 1934	2	0
Mycologists resident in the British Empire, 1938	1	0

PUBLICATIONS OF THE IMPERIAL AGRICULTURAL BUREAUX

I. Obtainable from the Imperial Bureau of Soil Science, Rothamsted Experimental Station, Harpenden, Herts.

Soils and Fertilisers.

A comprehensive abstract journal of soil science published six times yearly.

	British Commonwealth.	Foreign.
	s. d.	s. d.
Ordinary edition	20 0	25 0
Special edition (printed one side only)	25 0	30 0
Both editions	40 0	50 0
Single copies, ordinary edition only	5 0	5 0

Discontinued Series.

The following series of multigraphed periodicals have now been incorporated in *Soils and Fertilisers*. Annual sets (some incomplete) are obtainable at the prices given below.

Publications relating to Soils and Fertilisers (monthly) 1935 (8 issues) 6s.; 1936 (10 issues) 7s. 6d.; 1937 (10 issues) 7s. 6d.

Monthly Letters. 1935 (10 issues); 1936 (12 issues); 1937 (11 issues); 4s. per annum.

Recent Developments in Soil Analysis (quarterly), Complete Sets, 8s.

*Occasional Papers***Technical Communications.**

	<i>s.</i>	<i>d.</i>
10. The Arrangement of Field Experiments and the Statistical Reduction of the Results (by R. A. Fisher and J. Wishart)	1	0
14. Weights and Measures occurring in Agricultural Publications of the Empire Overseas	0	6
17. Proceedings of a Conference on Soil Science Problems, September, 1930	1	6
20. Lucerne "Inoculation" and the Factors affecting its Success	1	6
23. The Reclamation of Alkali Land in Hungary (A. A. J. de'Sigmond)	1	6
24. Laterite and Laterite Soils	2	0
26. The Dispersion of Soils in Mechanical Analysis	2	0
27. Land Amelioration in Germany (by H. Janert)	2	0
28. Soil Erosion (by T. Eden)	2	0
29. Soil, Vegetation and Climate	2	0
30. The Determination of Exchangeable Bases in Soil	2	0
33. Organic Manures (by S. H. Jenkins)	2	0
34. Tropical Soils in relation to Tropical Crops	2	6
35. The Design and Analysis of Factorial Experiments (by F. Yates)	5	0
36. Erosion and Soil Conservation*	5	0
37. Soil Structure (by E. W. Russell)	2	0
Annual Report: For the years 1929-30 to 1937-38	0	6

* Joint publication of bureaux of Soil Science and Pastures and Forage Crops.

Bibliographies.

Bibliography on Tobacco	2	0
Bibliography on Coffee	2	0
Catalogue of Journals and Periodicals in the Library of Rothamsted Experimental Station	2	0

Special Publication.

The Katamorphism of Igneous Rocks under Humid Tropical Conditions (by the late Sir J. B. Harrison)	5	0
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Bibliography of Soil Science, Fertilizers and General Agronomy, 1931-34	25	0
1934-37	25	0

II. Obtainable from the Imperial Bureau of Animal Health, Veterinary Laboratory, New Haw, Weybridge, Surrey.

*Abstracting Journal***The Veterinary Bulletin.**

	<i>s.</i>	<i>d.</i>
1931. Vol. 1. Quarterly (1st Number, April)	7	6
Annual Subscription	20	0
Subsequent Volumes. Monthly (1st Number, January)	5	0
Annual Subscription (postage paid)	40	0

(Back Numbers still available.)

Indexing Publication

Index Veterinarius —First issue April, 1933.	Annual Subscription (postage paid).	..	..	s.	d.
Volumes I to III mimeographed, Volume IV onwards printed				100	0
Volumes I to V issued quarterly.	Volume VI onwards issued half-yearly.				
(Back numbers are still available.)					

Occasional Papers

Review Series.

No. 1.	Bovine Mastitis, by E. Munch-Petersen	10	0
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III. Obtainable from the Imperial Bureau of Animal Nutrition, Rowett Research Institute, Bucksburn, Aberdeen.

Journal

Nutrition Abstracts and Reviews. (Issued under the direction of the Imperial Agricultural Bureaux Council, the Medical Research Council and the Reid Library.)											<i>s.</i>	<i>d.</i>
Subscription per Volume of 4 numbers											42	0
Per single number											13	0

Occasional Papers

Technical Communications.

- | | | | |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|
| 1. | A. I. V. Silage | 0 | 6 |
| 3. | Recent Research on Forage Crop Cultivation, Fodder Conservation and Utilization, at the
Animal Breeding Institute of the University, Konigsberg | 1 | 0 |
| 4. | Problems of Animal Nutrition and Animal Husbandry in Northern Nigeria | 1 | 0 |
| 5. | Recent Research in Poultry Nutrition, by A. R. G. Emslie | 1 | 0 |
| 6. | The Composition of Certain African Foods and Feeding Stuffs | 1 | 0 |
| 7. | Wheat: Pre-eminence as a Cereal Food, Nutritive Value; Relation to Health and Disease.. | 1 | 0 |
| 8. | Nutrition Research in the British Colonial Empire | 1 | 0 |
| 9. | Methods for the Chemical Analysis of Biological Material in Nutrition Investigations .. | 1 | 0 |
| 10. | Table of Composition of Foods, Giving the Energy Value, Protein, Fat, Carbohydrate, Calcium,
Phosphorus and Iron Content of some 300 Foods Commonly Used in Great Britain and
Compiled for Use in the Analysis of Dietary Surveys | 1 | 0 |

Occasional Communications.

- | | | | | | |
|---------------------------------------------------------------|----|----|----|----|----|
| 1. The Effect of Climate on the Composition of Pasture Plants | .. | .. | .. | .. | .. |
| 2. Etiology of Endemic Goitre | .. | .. | .. | .. | .. |

IV. Obtainable from the Imperial Bureau of Plant Breeding and Genetics, School of Agriculture, Cambridge.

Journal

	s.	d.
Quarterly. Annual Subscription	*25	0
Single copies	7	6
Volume I (Nos. 1, 2 and 3 out of print) No. 4 available	7	6
" II Out of print.		
" III (Nos. 1, 2 and 4 out of print) No. 3 available	7	6
" IV (Nos. 1, 2 and 4 out of print) No. 3 available	7	6
" V (No. 2 out of print), Nos. 1, 3, 4 available	17	6
" VI (complete)	20	0
" VII (complete)	20	0
Numbers printed on one side of paper	30	0

* 20s. to subscribers in the British Commonwealth.

Occasional Papers

Indexes to Plant Breeding Abstracts.

Subject Index to Vols. I to V of Plant Breeding Abstracts	5	0
Subject Index to Vols. VI and VII of Plant Breeding Abstracts	2	6

Supplements to Plant Breeding Abstracts.

Summary of Reports received from Countries exclusive of the British Empire, 1928-31	s. d.
Supplement I	2 6
Summary of Reports received from Stations in the British Empire, 1932-35. Supplement II	5 0

Technical Communications.

Vernalization and Phasic Development of Plants. (Joint Publication with the Imperial Bureau of Pastures and Forage Crops)	10 0
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Bibliographical Monographs.

Lodging in Cereals	0 6
Oat Breeding Bibliography	1 6
Rice Breeding Bibliography	1 6
Bibliography on Interspecific and Intergeneric Hybridization in Relation to Plant Breeding	2 0
Account of the Research in Progress in the British Empire	3 6
Rye Breeding Bibliography	1 6
Bibliography on Breeding Sorghums and Millets	1 0
Bibliography of Baking Quality Tests	2 6
Breeding Resistant Varieties, 1930-33 (Supplement)	2 0
The Experimental Productions of Haploids and Polyploids	5 0
The South American Potatoes and their Breeding Value	3 6
An Outline of Cytological Technique for Plant Breeding	1 6
Tobacco Breeding Bibliography	1 0

V. Obtainable from the Imperial Bureau of Pastures and Forage Crops, Welsh Plant Breeding Station, Agricultural Buildings, Alexandra Road, Aberystwyth, Wales.

	<i>Journal</i>	s. d.
Herbage Abstracts.		
Vol. 7, 1937 (printed both sides)		15 0
Vol. 7, 1937 (printed one side only)		20 0
Vol. 8, 1938 { Published price		25 0
{ Price in Great Britain and British Commonwealth		20 0

Herbage Reviews.

Vol. 5, 1937	10 0
Vol. 6, 1938	*15 0

* A reduction of 5s. will be given when Herbage Abstracts is also ordered.

*Occasional Papers***Bulletins.**

3. The Breeding of Herbage Plants: Technique adopted at the Welsh Plant Breeding Station. June, 1931	3 0
6. Research on Forage Crops in Soviet Central Asia, with Special Reference to Turkestan Lucerne. March, 1932	1 6
7. Further Contributions on the Technique Employed in the Breeding of Herbage and Forage Plants, May, 1932	2 0
17. Vernalization and Phasic Development of Plants. 1935. (Joint publication with the Imperial Bureau of Plant Breeding and Genetics)	10 0
18. Grassland and Forage Crops in the Union of South Africa. October, 1936	3 0
19. Production of Grass Seed. June, 1937	5 0
20. Insects and Other Pests Injurious to Seed Production in Herbage and Forage Crops, by H. F. Barnes. June, 1937	2 6
21. The Influence of Climatic Conditions on Type Composition, by N. Sylvén. June, 1937	1 0
22. Technique Adopted in the Production of Grass Seed at the Welsh Plant Breeding Station by Gwilym Evans. July, 1937	5 0
23. Production of Seed of Herbage and Forage Legumes. September, 1937	5 0
24. Collection of Native Grass Seed in the Great Plains, U.S.A., by E. J. Crider and M. M. Hoover. September, 1937	2 0
25. Erosion and Soil Conservation*	5 0

* Joint publication of bureaux of Soil Science and Pastures and Forage Crops.

VI. Obtainable from the Imperial Bureau of Horticulture and Plantation Crops, East Malling Research Station, East Malling, Kent.

Journal

Horticultural Abstracts. A quarterly abstract publication of current horticultural literature.	<i>s.</i>	<i>d.</i>
Vol. I. First issued, March, 1931. No. 2, single copy	1	6
Vol. II. Nos. 1, 2 and 3 out of print. No. 4, single copy	1	6
Vols. III to VII, each (single copy, 4s. 0d.)	15	0
Vols. VIII and subsequent volumes. Annual Subscription	*25	0
Single copy	6	6

* 20s. a volume or 5s. a number to subscribers in the British Commonwealth.

Technical Communications

2. Field Experiments in Horticulture. 1931. T. N. Hoblyn	2	0
3. Investigations on the Standardisation of Citrus Trees by Propagation Methods. 1932	2	0
4. Problems of Fruit Tree Nutrition: Possible Lines of Approach. 1933. T. Wallace	2	0
5. The "Degeneration" of the Strawberry. 1934. D. Akenhead, R. V. Harris, G. H. Berkeley, A. M. Massee	2	0
6. The Nutrition and Manuring of Soft Fruits. 1936. T. Wallace	2	0
7. Vegetative Propagation of Tropical and Sub-tropical Fruits. 1936. G. St. Clair Feilden and R. J. Garner	2	0
8. Horticultural Aspects of Woolly Aphis Control, together with a survey of the literature. 1936. R. M. Greenslade	2	6
9. A Review of the Literature on Stock-Scion Incompatibility in Fruit Trees, with particular reference to pome and stone fruits. 1937. G. K. Argles	5	0
10. Plant Injection for Diagnostic and Curative Purposes, 1938. (W. A. Roach)	5	0

Occasional Papers

1. Technique in Pot Culture for Fruit Plants. 1933. Dr. T. Wallace	0	6
2. Experimental Data on Orchard and Small Fruit Manuring. 1933. S. T. Antoshin	1	0
3. Annotated Bibliography on Bitter-Pit. 1934	1	6
5. Frameworking of Fruit Trees. 1938. R. J. Garner and W. F. Walker	1	0

Proceedings of First Imperial Horticultural Conference, 1930.

Part II. Papers on the application of Science to Horticulture. 1931. 2s. Out of print, but the following separates are available, each	0	3
Field Experiments in Certain Tropical and Sub-Tropical Crops in West Africa (Dr. E. J. Martin and W. H. Beckett).		
Fruit Products and Associated Problems (Professor B. T. P. Barker).		
Some Physiological Considerations in Horticulture (Professor V. H. Blackman).		
Plant Physiological Work in the Tropics: Some of the Problems, with Special Reference to Cocoa and some Possible Lines of Attack (Dr. T. G. Mason and Dr. E. J. Maskell).		
Soil and Survey Work as a Basis for Fruit Production in Irrigated Areas (Professor A. J. Prescott).		
Part III. Papers on Progress in Fruit Storage Methods, 1931, 2s. 6d. Out of print, but the following separates are available, each	0	3
Factors Influencing the Storage Qualities of Fruit (Dr. T. Wallace).		
The Present Position of the Bitter-Pit Problem in Australia (W. M. Carne, H. A. Pittman and H. G. Elliott).		
The Behaviour and Diseases of the Banana in Storage and Transport (Dr. C. W. Wardlaw and Dr. L. P. McGuire).		
Problems of Storage and Transport (E. A. Griffiths).		
Fruit Transport Problems in Canada (R. L. Wheeler).		
The Infection and Invasion of the Apple Fruit by Fungi in Relation to the Problem of Storage (Dr. A. S. Horne).		
Experiments on the Preservation of Citrus Fruits (Dr. W. J. Young and F. M. Read).		

Other Publications.

Index to Volumes I-X of the <i>Journal of Pomology and Horticultural Science</i> , 1933. Compiled by Bureau, published by the Editors of the <i>Journal of Pomology and Horticultural Science</i> . Available from the Bureau	5	0
Old and new standpoints on senile degeneration, 1931. By A. P. C. Bijhouwer	0	6

VII. Obtainable from the Imperial Bureau of Animal Breeding and Genetics, Institute of Animal Genetics, University of Edinburgh, King's Buildings, West Mains Road, Edinburgh.

Journal

	<i>s.</i>	<i>d.</i>
Animal Breeding Abstracts (quarterly). From Vol. 6 (1938) Annual subscription	25	0
Subscribers in the British Commonwealth	20	0
Earlier Volumes, from 1933, Vol. 1-5 Annual subscription	15	0

Occasional Papers

Bibliography on the Biology of the Fleece, 1931	1	6
Bibliography on Fur Breeding (mimeographed), 1931	1	0
Bibliography on the Genetics and Sex Physiology of the Rabbit (mimeographed), 1931	1	0
The Physiological and Genetical Aspects of Sterility in Domesticated Animals, with Bibliography, 1932	2	6
The Technique of Artificial Insemination, 1933	2	6
Bibliography of the works of J. C. Ewart (free to subscribers of Animal Breeding Abstracts, Vol. 1), 1934	0	6
Animal Breeding in the British Empire. A Survey of Research and Experiment, 1934	2	0

Also obtainable from the Bureau :

The Genetics of the Horse, 1930. Reprinted from "Bibliographia Genetica"	0	6
Inheritance of Productivity in Farm Stock, 1935. Reprinted from "Empire Journal of Experimental Agriculture"	0	6
The Genetics of the Pig, 1936. Reprinted from "Bibliographia Genetica"	2	6

VIII. Obtainable from the Imperial Bureau of Agricultural Parasitology (Helminthology), Institute of Agricultural Parasitology, Winches Farm Drive, Hatfield Road, St. Albans, Herts.

Journal

	<i>s.</i>	<i>d.</i>
Bibliography of Helminthology. For the years 1930, 1931, 1932, 1933—		
Library Edition, bound in cloth, per volume	10	6
Stiff paper cover only, per volume	8	0
Helminthological Abstracts (1932 onwards). Issued in five or six parts per volume, each volume covering the literature published in a single year. Subscription per volume, payable in advance	30	0
Completed volumes bound in cloth	32	0
[Note from Vol. III (1934) this journal incorporates the <i>Bibliography of Helminthology</i> and is published by the Bureau instead of by the <i>Journal of Helminthology</i> .]		

Other Publications

(a) The Root-infesting Eelworms of the Genus <i>Heterodera</i> . A Bibliography and Host List. viii + 99 pp., 2 plates.		
Library Edition, bound in cloth	8	6
Stiff paper cover only	6	0
(b)* The Helminth Parasites of Common Rats. By J. N. Oldham, 42 pp.	2	0
(c)* The Genus <i>Anguillulina</i> Garv. & v. Ben., 1859, vel <i>Tylenchus</i> Bastian, 1865. By T. Goodey, 106 pp., 117 figs.	6	0
(d) The Bursate Lungworms of Domesticated Animals. By T. W. M. Cameron, 36 pp.	5	0
(e) The Scope and Aims of the Imperial Bureau of Agricultural Parasitology. By B. G. Peters, 6 pp.; free on application.		
(f) Recent Researches on Helminth Immunity. By Phyllis A. Clapham, 20 pp.	3	0
(g) The Pathology and Aetiology of Plant Lesions caused by Parasitic Nematodes. By T. Goodey, 34 pp.	5	0
(h) The Bearing of the Physiology of Parasitic Nematodes on their Treatment and Control. By G. Lapage, 21 pp.	3	0
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* These appeared originally in the *Journal of Helminthology* and are now issued separately in stiff paper covers.

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